This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

nders' Question Co

LANE MEDICAL LIBRARY STANFORD
L356 .S53 1913 STOR
Essentials of nervous diseases and insan

ENTIALS OF

ERVOUS DISEASES AND

JOHN C. S

FIFTH EDITION

L. B. Dickey

Get the Best R. J. Stewart. **The New Standard**
Abbott Hospital 1-6-18

DORLAND'S

Minneapolis-Minn.

AMERICAN ILLUSTRATED

MEDICAL DICTIONARY

LANE
MEDICAL LIBRARY
SEAL OF THE LELAND STANFORD JUNIOR UNIVERSITY
SEMPER VIRENS
1885
Gift
Dr. L. B. Dickey
AMERICAN BANK NOTE CO. LITHO

should be on your desk for ready reference.

This new edition is really a new work, having been entirely reset. It is a correct key to capitalization and pronunciation, and *defines* all the newest words.

"I have very carefully looked the volume over, and note with pleasure the many changes in the new edition. It had seemed to me that the work was complete before, but this copy shows how much new matter can be gathered for a great work of this kind."—JOHN B. MURPHY, M. D., *Northwestern University Medical School.*

"Dr. Dorland's Dictionary is admirable. It is so well gotten up and of such convenient size. No errors have been found in my use of it."—HOWARD A. KELLY, *Professor of Gynecology, Johns Hopkins University, Baltimore.*

W. B. SAUNDERS CO., West Washington Square, Phila.
London: 9, Henrietta Stre

Seventh Edition, Revised With Complete Vocabulary

THE

AMERICAN POCKET

MEDICAL DICTIONARY

EDITED BY

W. A. NEWMAN DORLAND, A. M., M. D.,

Editor "American Illustrated Dictionary."

HUNDREDS OF NEW TERMS

Bound in Full Leather, Limp, with Gold Edges. Price, $1.00 net; with Patent Thumb Index, $1.25 net.

The book is an **absolutely new one.** It is not a revision of any old work, but it has been written entirely anew and is constructed on lines that experience has shown to be the most practical for a work of this kind. It aims to be **complete,** and to that end contains practically all the terms of modern medicine. This makes an unusually large vocabulary. Besides the ordinary dictionary terms the book contains a wealth of **anatomical and other tables.** This matter is of particular value to students for memorizing in preparation for examination.

"I am struck at once with admiration at the compact size and attractive exterior. I can recommend it to our students without reserve."—JAMES W. HOLLAND, M. D., *of Jefferson Medical College.*

"This is a handy pocket dictionary, which is so full and complete that it puts to shame some of the more pretentious volumes."—*Journal of the American Medical Association.*

"We have consulted it for the meaning of many new and rare terms, and have not met with a disappointment. The definitions are exquisitely clear and concise. We have never found so much information in so small a space."—*Dublin Journal of Medical Science.*

"This is a handy little volume that, upon examination, seems fairly to fulfil the promise of its title, and to contain a vast amount of information in a very small space. . . . It is somewhat surprising that it contains so many of the rarer terms used in medicine."—*Bulletin Johns Hopkins Hospital,* Baltimore.

W. B. SAUNDERS CO., West Washington Square, Phil

London: 9, Henrietta Street, Covent Garden

SINCE the issue of the first volume of the **Saunders Question-Compends,**

OVER 342,000 COPIES

of these unrivalled publications have been sold. This enormous sale is indisputable evidence of the value of these self-helps to students and physicians.

SAUNDERS' QUESTION-COMPENDS, No. 21

ESSENTIALS

OF

NERVOUS DISEASES AND INSANITY

THEIR

SYMPTOMS AND TREATMENT

BY

JOHN C. SHAW, M.D.

Late Clinical Professor of Diseases of the Mind and Nervous System,
Long Island College Hospital Medical School

FIFTH EDITION, THOROUGHLY REVISED

BY

LOUIS CASAMAJOR, M.A., M.D.

Chief of Clinic, New York Neurological Institute; Assistant Neurologist,
City Hospital, New York

ILLUSTRATED

PHILADELPHIA AND LONDON
W. B. SAUNDERS COMPANY
1913

LANE LIBRARY

Copyright, 1891, by W. B. Saunders. Revised, reprinted, and recopyrighted November, 1893. Revised, reprinted, and recopyrighted August, 1897. Reprinted September, 1902. Revised, entirely reset, electrotyped, reprinted, and recopyrighted February, 1904. Reprinted July, 1907, and November, 1910. Revised, reprinted, and recopyrighted September, 1913

Copyright, 1913, by W. B. Saunders Company

PRINTED IN AMERICA

PRESS OF
W. B. SAUNDERS COMPANY
PHILADELPHIA

S53
1913

PREFACE TO THE FIFTH EDITION

NEUROLOGY and Psychiatry undoubtedly lead to-day all other branches of medicine in the rapidity of their progress, and the present revision of this volume has been made with the idea of placing what is new before the student. In the part on nervous diseases, the previous edition has been followed rather closely, but new work, such as cerebrospinal fluid findings, etc., has been added. A short description of cerebrospinal syphilis has been included. The section on Aphasia has been rewritten to bring it into line with the teachings of Liepmann. As in the previous editions, no attempt has been made to describe rare conditions.

The chapters on diseases of the mind have been almost entirely rewritten and the arrangement changed, systematizing the material to accord with the teachings of modern psychiatrists, particularly Kraepelin and Meyer.

90633

PREFACE.

THIS little book is not intended to take the place of the larger and more complete works, but to be used somewhat as a primer—for advanced students.

The limits of the book forbade the introduction of anatomical detail and physiological discussion. It is expected that the student will use, in conjunction with this volume, Edinger's Lectures on the Structure of the Central Nervous System, and the small monograph of Dr. Wm. Browning on the Vessels of the Brain.

The question of diagnosis has not been entered into fully, as it is believed that a knowledge of these diseases must precede a clear appreciation of their differential points.

A few diseases not frequently met with have been omitted. In the section on Insanity, the arrangement and descriptions have been made as simple as possible. Much more detail could have been given, and other phases of mental disorder described, but it is believed that too much amplification would have tended to confuse the student. If, with clinical teaching, a few outlines can be obtained, detail can be best and more readily added later.

There is appended to the end of the description of many of the diseases a Bibliography, or rather a list of references. Though this list has no pretension whatever to completeness, it may be of use to the student in looking up the subjects, if he so desires. Almost all the references are to the writings of American neurologists. These, it is believed, will be readily accessible to the student; and they so fully deal with the subjects as to make reference to foreign authors unnecessary. The works of Leyden, and of Charcot and his pupils, Kussmaul, Nothnagel, Westphal, can all be consulted, and are referred to in the description of the diseases.

I have to thank a number of medical friends for many kindnesses—the taking of photographs of cases for me, for which credit is given under the illustrations.

All the illustrations have been made by Mrs. J. C. Shaw from reproductions in pen and India ink from photographs or other illustrations.

CONTENTS

SECTION I

DISEASES OF THE PERIPHERAL NERVOUS SYSTEM

PAGE

CHAPTER I.—THE PERIPHERAL SENSORY NEURONS—ANALGESIAS AND NEURALGIAS........................ 17

Neuralgias, 17—Coccygodynia, 18—Tarsalgia, 18—Morton's Tarsalgia, 18—Plantar Neuralgia, 18—Lumbo-abdominal Neuralgia, 18—Neuralgia Paræsthetica, 18—Cervico-occipital Neuralgia, 18—Cervicobrachial Neuralgia, 18—Trifacial Neuralgia, 19—Herpes Zoster, 20.

CHAPTER II.—DISEASES OF THE PERIPHERAL MOTOR OR MOTOR-SENSORY NEURONS........................... 21

Injuries of Nerves, 21—Neuritis, 23—Multiple Neuritis, 24—Alcoholic Neuritis, 25—Diphtheritic Neuritis, 26—Lead Neuritis, 27.

CHAPTER III.—PARALYSIS OF MUSCLES SUPPLIED BY THE PERIPHERAL MOTOR NERVES..................... 28

Paralysis of the Oculomotor, 28—Paralysis of the External Rectus or Sixth Nerve, 29—Peripheral Facial Paralysis (Bell's Palsy), 29—Paralysis of the Median Nerve, 33—Paralysis of the Ulnar Nerve, 33—Paralysis of the Musculospiral Nerve, 33—Paralysis of the Circumflex Nerve, 34—Paralysis from Injury to the Brachial Plexus (Obstetric Paralysis; Duchenne-Erb Paralysis), 34—Paralysis of the Laryngeal Branches of the Vagus, 38—Paralysis of the Lumbar and Sacral Plexus, 38.

SECTION II

DISEASES OF THE SPINAL CORD AND MEDULLA

PAGE

CHAPTER I.—INVOLVEMENT OF MOTOR NUCLEI—ANTERIOR POLIOMYELITIS 40

Infantile Spinal Paralysis, 40—Acute and Subacute Spinal Paralysis in the Adult, 43—Acute Ascending Paralysis, 44—Chronic Myelitis of the Anterior Horns of the Spinal Cord, 46—The Peroneal Form of Herbert Tooth, 49.

CHAPTER II.—DISEASE OF THE POSTERIOR COLUMNS 50

Tabes Dorsalis (Locomotor Ataxia), 50.

CHAPTER III.—DISEASES OF THE ANTEROLATERAL COLUMNS.. 58

Lateral Sclerosis, 58—Little's Disease, 60.

CHAPTER IV.—LESION OF THE POSTEROLATERAL COLUMNS—THE COMBINED SCLEROSES 60

Combined Sclerosis, 60—Ataxic Paraplegia, 60—Friedreich's Ataxia, 61.

CHAPTER V.—LESION OF THE ANTERIOR HORNS AND OF THE LATERAL TRACTS 64

Amyotrophic Lateral Sclerosis, 64.

CHAPTER VI.—LESIONS OF THE CENTRAL GREY SUBSTANCE 66

Syringomyelia, 66.

CHAPTER VII.—DIFFUSE DISEASES OF THE CORD 70

Myelitis, 70—Compression Myelitis, 72—Tumors of the Cord, 74.

CHAPTER VIII.—LOCALIZATION OF LESIONS IN THE SPINAL CORD 74

Localization of the Functions of the Segments of the Spinal Cord, 77.

CHAPTER IX.—MULTIPLE SCLEROSIS 78

SECTION III

DISEASES OF THE MENINGES—SPINAL AND CEREBRAL

MENINGITIS 81

Acute Spinal Meningitis, 81—Purulent Meningitis, 81—Tuberculous Meningitis, 82—Chronic Syphilitic Meningitis, 83.

SECTION IV

DISEASES OF THE BRAIN—THE CEREBRAL VESSELS AND OTHER NON-NERVOUS ELEMENTS

PAGE

CHAPTER I.—THE LOCALIZATION OF BRAIN DISEASES........ 85

Convulsive Movements, 85—Paralysis, 86—Disturbances of Touch, 88—Disturbances of Vision, 88—Disturbances of Hearing, 90—Disturbances of Smell, 90—Disturbances of Taste, 90—Lesion of the Basal Ganglia, 91—Lesion of the Corpora Quadrigemina, 91—Lesion of the Tegmentum, 91—Lesion of the Pons and Medulla, 91—Lesions of the Brain Base, 93—Lesions of the Hypophysis, 93—Lesion of the Cerebellum, 94—Lesions of the Middle Peduncles of the Cerebellum, 94—Aphasia, 94.

CHAPTER II.—DISEASES OF THE BRAIN.................... 97

Apoplexy, 97—Cerebral Hemorrhage, 97—Occlusion of Vessels, 99—Spastic Hemiplegia in Children, 100—Intracranial Tumors, 103—Abscess of the Brain, 106—Chronic Hydrocephalus (Internal), 107.

SECTION V

DISEASES OF OTHER ORGANS USUALLY INCLUDED UNDER DISEASES OF THE NERVOUS SYSTEM

CHAPTER I.—DISEASES OF THE MUSCLES.................. 109

Muscular Dystrophies, 109—Pseudohypertrophic Muscular Dystrophy, 109—Erb's Juvenile Atrophy, 111—Thomsen's Disease, 112.

CHAPTER II.—DISEASES OF THE DUCTLESS GLANDS......... 113

Exophthalmic Goiter, 113—Cretinism, 116—Myxedema, 117—Acromegaly, 118.

SECTION VI

THE PSYCHONEUROSES: DISORDERS OF UNDETERMINED PATHOGENY

CHAPTER I.—NEURASTHENIA 121

Traumatic Neurosis, 125.

PAGE
CHAPTER II.—MOTOR NEUROSES.......................... 125
Occupation Neuroses, 125—Writer's Cramp, 126—The Muscular Spasms or Tics, 126—Habit Spasms, 126—Spinal Accessory Spasm, 127—Unilateral Facial Spasm, 128—Torticollis, 128—Facial Spasm, 129—Nodding Spasm, 129—Spasmodic Tic of Gilles de la Tourette, 129—Tetany, 129—Chorea, 130—Hereditary Chorea, 131—Paralysis Agitans, 132—Epilepsies, 134.

CHAPTER III.—VASOMOTOR NEUROSES..................... 137
Headache, 137—Hemicrania, 139—Vasomotor Spasm and Paralysis, 140—Raynaud's Disease, 143—Unilateral Facial Atrophy, 144.

SECTION VII

DISEASES OF THE MIND—THE PSYCHOSES

CHAPTER I.—CONSTITUTIONAL PSYCHOSES.................. 147
Hysteria, 147—Constitutional Psychopathy, 152.

CHAPTER II.—GENERAL NEUROPSYCHOSES.................. 154
Epileptic Psychosis, 154—Hysterical Psychosis, 156.

CHAPTER III.—INTOXICATION PSYCHOSES................... 157
Alcoholic Psychoses, 157—Acute Alcoholic Hallucinosis, 157—Korsakow's Psychosis, 158—Chronic Alcoholic States, 158—Infective-exhaustive Psychoses, 159.

CHAPTER IV.—DEGENERATIVE PSYCHOSES.................. 160
Dementia Præcox, 160—General Paralysis of the Insane, 162—Senile Psychosis, 167.

CHAPTER V.—PARANOIC CONDITIONS...................... 168

CHAPTER VI.—THE SIMPLE PSYCHOSES—MANIC DEPRESSIVE INSANITY; INVOLUTION MELANCHOLIA.............. 171
Manic-depressive Insanity, 171—Involution Melancholia, 174.

CHAPTER VII.—DEFECTIVE MENTAL DEVELOPMENT......... 176
Imbecility and Idiocy, 176.

INDEX... 181

ESSENTIALS

OF

NERVOUS DISEASES

AND INSANITY.

ESSENTIALS OF NERVOUS DISEASES AND INSANITY.

SECTION I.

DISEASES OF THE PERIPHERAL NERVOUS SYSTEM.

CHAPTER I.

THE PERIPHERAL SENSORY NEURONS—ANALGESIAS AND NEURALGIAS.

ALMOST any of the sensory nerves may be affected in such a manner as to cause pain. In a number of diseases, notably in neurasthenia, some disturbance in their metabolism gives rise to peculiar tingling sensations, not painful, but annoying; such have been termed *paresthesias*. At times such tingling sensations have associated cold sensations, when they are termed *acroparesthesias*. Loss of sensation may take place in a large number of affections, but there are few isolated *anesthesias* or *analgesias* save as a result of injury. Analgesia or anesthesia is a characteristic symptom in some hemiplegias, in some cases of transverse myelitis, in many of the atrophies, and in syringomyelia. There is a sensory type of peripheral neuritis.

NEURALGIAS.

Painful affections are widely distributed. Those which show a comparatively distinct localization have received distinct names. The commonest forms of these localized neuralgias are:

Coccygodynia.—This is a neuralgia affecting the lower sacral nerves in their posterior branches. It occurs more particularly in women, and is a direct result, for the most part, of injury done to the pelvic floor, as a result of child-birth, of constipation, or of pelvic disease, or following an accident.

The symptoms are those of pain during walking and sitting, felt especially at the end of the spine, and difficult and painful defecation.

Tarsalgia.—This is a form of neuralgia which affects the feet, particularly in those who stand or walk much. Shop-girls, waiters, postmen, and policemen are most often affected. The affection is largely due to the injury done to the arch of the foot by the weight thrown upon it. Flatfoot is a common accompaniment.

Morton's tarsalgia is a special form found in women, particularly those who have loosely articulated and delicate bony structures in the foot. The nerves are frequently pinched between the third and fourth metatarsophalangeal joint.

These foot forms of neuralgia are best treated by suitable shoes. Casts of the foot are made, and appropriate supports constructed on these lines.

Plantar neuralgia occurs in the plantar nerves.

Lumbo-abdominal neuralgia (*lumbago*) affects the lumbar nerves and is at times a very persistent type of this affection.

Neuralgia paræsthetica is a mild form of femoral neuralgia accompanied by paresthesias.

Mammary neuralgia, intercostal neuralgia, digital neuralgia, cervicobrachial and **cervico-occipital neuralgia** are other special types.

Cervico-occipital Neuralgia.—This is characterized by pain in the distribution of the occipital nerve, but it may and often does radiate into the distribution of the cervical nerves.

Cervicobrachial Neuralgia.—The pain here is in the distribution of the cervical and brachial nerves, and is of the same character as in the neuralgias of the fifth nerve, but more constant and dull and less exactly localized.

Trifacial Neuralgia.—Heredity is said to play a part in its predisposing causes. It has been observed to affect several generations of a family. It is frequent in those predisposed to neuralgias and other nervous diseases. It is most common in middle and advanced life; it is more frequent in women than in men. Anemia and general disorders of nutrition, from whatever cause, predispose to it. Malarial infection is a common cause; cold drafts from open windows, wounds, diseases of the parts in the neighborhood of the nerve and its branches, disease of the cranial bones, periostitis, exostosis, injuring the nerve as it passes through its bony canals; intracranial tumors; tumors developing on the nerve itself. Disease of the teeth and nose is an occasional cause.

Symptoms.—Pain in the distribution of the nerve of more or less severity; it is sharp, shooting in character, coming on in paroxysms. The entire nerve may be involved, but the ophthalmic or supra-orbital branches are the most frequently affected.

Supra-orbital Neuralgia.—In those patients in which the superior or inferior maxillary branches are implicated, the pain is felt in the teeth. If the attack is severe, there is constant pain, with paroxysms of intense, lightning-like pain. If the attack has been of some duration, tender spots will be found at various places, usually where the nerve becomes superficial. The skin is often hyperesthetic, and in some chronic cases there may be anesthesia. After the attack is well established, the face is red and the local temperature may be elevated. The arteries on that side pulsate violently, and there may be an abundant flow of tears.

Prognosis.—The majority of these cases recover, but there is a proportion which are very obstinate—those in which serious nutritive changes play a part in the causation. There is also a proportion in which medicinal treatment does very little good.

Treatment.—In those which have a suspicion of malaria as the exciting cause quinin, 5 or 10 grains at night, and $\frac{1}{200}$ of a grain of aconitin taken two or three times a day, preceded by a mercurial cathartic, will almost certainly cure them. This treatment will often cure cases that are apparently not malarial. Sometimes 15- or 20-grain doses of phenacetin will give the desired result. If there is anemia, iron in one of its preparations should be given, or arsenious acid and a generous diet, with butter, fats, cream, or cod-liver oil and fresh air with moderate exercise. In some troublesome cases phosphorus may give some benefit. If it is suspected that the neuralgia is caused by carious teeth, they should be examined by some good dentist. Those cases dependent upon disease of the bones must be treated by the surgeon. In those cases incurable by medicine operations on the nerve have often given relief for long periods of time. There is a tendency to recurrence of the pain even in these cases. Alcohol injections in the nerve trunk give relief in many cases. As a final resort, the Hartley-Krause operation should be performed.

HERPES ZOSTER.

This name is given to an erythematous and papular eruption which comes on as a trophic symptom in neuralgia. The eruption is always along the course of a nerve or its branches. It is preceded by the stabbing pains and by a tingling, itching sensation along the course of the nerve or its branches. The eruption is very frequently in patches. The pustules may suppurate, and when they are large, leave scars ; or they may simply dry up and disappear without any after-symptoms. At times when it occurs in elderly persons there is a painful neuralgia in the nerve after the subsidence of the eruption, and it may last for years, indicating probably a serious change in the nerve. It may be found in association with neuralgia of almost any nerve—the fifth, the intercostals, those of the lumbar and sacral plexus. When it is in the fifth nerve, it is the supra-orbital branches that is its seat, and if the ophthalmic branches are involved, there is danger of trophic disturbances of the cornea.

It is sometimes apparently due to epidemic influences.

Pathologically, zoster has been ascribed to neuritis and to a hemorrhagic inflammation of the spinal ganglia of the nerves supplying the part affected (Head and Campbell).

CHAPTER II.

DISEASES OF THE PERIPHERAL MOTOR OR MOTOR-SENSORY NEURONS.

INJURIES OF NERVES.

THE nerves may be injured as the result of gunshot wounds; tearing injuries by machinery; cutting by dull or sharp instruments; by falls; or from the pressure of cicatrices, tumors, bony exostoses, aneurysms in the subclavian, popliteal, or other arteries; from pressure during parturition; as a complication in fractures and dislocations; or from punctured wounds of the nerves themselves.

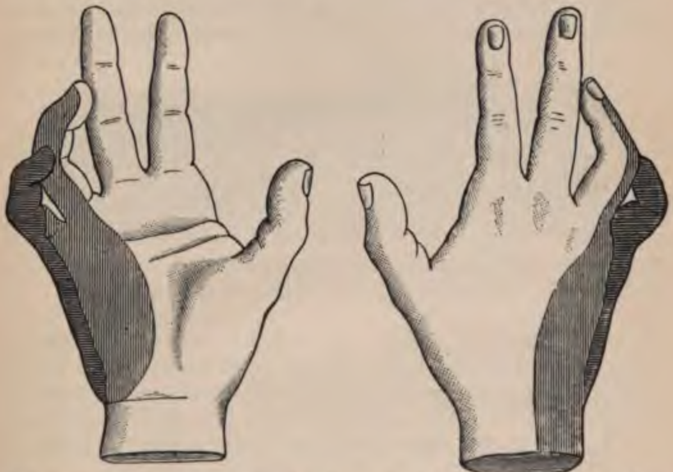

FIG. 1.—Showing sensory loss and ordinary position in injuries of the ulnar nerve (Bowlby).

Symptoms.—Pain is constant; it may be slight or severe; it is of a shooting, burning, or tearing character; most marked in the terminal distribution of the nerve or nerves injured, accompanied with a feeling of numbness and heaviness in the parts involved. Pressure on the inflamed nerve causes shooting, tingling pain radiating toward the periphery.

S. Weir Mitchell first described a painful burning sensation in the parts, under the name of causalgia. These pains are often associated with glossy skin. In addition to this burning sensation, the parts are exquisitely sensitive; the least touch increases the pain. Exposure to the air and contact are to be avoided; the parts should be kept carefully covered with cloth, oil, water, vaselin, etc. As the pain increases the temper becomes irritable, sleep is disturbed, the face exhibits a distressed expression. In severe cases trophic disturbances occur; the parts are bluish from impaired circulation. Bullæ may appear; there may be a little swelling of the entire limb below the injury, but greatest at the extremity; the joints are slightly swollen and inflamed. The muscles in the distribution of the injured nerve may atrophy, and sometimes this atrophy is exceedingly rapid, and contracture more or less marked may follow. Changes in the nails are observed; they become deformed, brittle, curved, lose their smooth external surface, and appear roughed and ridged. Anesthesia is present in the severe cases, and is in the distribution of the injured nerve (Fig. 1).

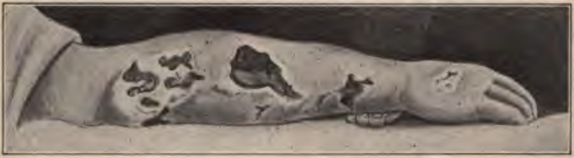

FIG. 2.—Showing the ulcerated surfaces on the ulnar side of the forearm in a case of injury to the ulnar nerve by puncture.

Ulcerations may occur in the parts supplied by the nerve; the skin and deeper tissues may slough in spots; the surrounding parts are red and inflamed (Fig. 2).

Diagnosis.—The history of an injury in the neighborhood of the nerve, the constant peculiar pains, the burning sensation, its limitation to the distribution of a single nerve or to a set of associated nerves, and the trophic disturbances described, render the diagnosis comparatively easy.

Prognosis.—Depends entirely upon the severity of the injury and the possibility of aid by medicinal or surgical means. Recovery is slow, even in the most favorable cases.

Treatment.—In division of the nerve, suture of the divided ends of the nerve is indicated after a careful study of the case. For the indications and the methods of applying the suture, consult the special works on injuries of nerves and works on surgery.

In nerve injuries from pressure the removal of the pressure is the first thing to be done if that is possible. In cases of lacerated wounds of the nerves, removal of any foreign body from the wound, soothing applications to the inflamed part, later, after subsidence of the inflammation, mild galvanism. If there results much inflammatory pressure or the nerve is so badly lacerated that improvement does not occur, the advisability of cutting down and suturing the ends must be considered.

When the pain is very severe, morphin will be necessary to give relief, especially at night.

NEURITIS.

This is an inflammation of the peripheral nerves; it may affect only one nerve, such as the median or ulnar, or almost all the nerves may be affected, when it is called polyneuritis or multiple neuritis.

It is characterized by pain in the distribution of the nerve or nerves diseased; the pain is constant, but there are paroxysms of sharp, needle-like stabs of greater or less severity; a sensation of tingling, heaviness, and formication is not infrequent. It has numerous causes, and as the etiology somewhat modifies the clinical picture, we will consider some of the cases from the standpoint of causation.

It may occur without any assignable cause in the median or ulnar nerves, even in the musculospiral, as a somewhat acute condition. There is a feeling of pain, aching, and oversensitiveness in the peripheral distribution of the nerve, and to a greater or less extent in all the distal side of the diseased nerve. It will be found tender to pressure, and sometimes exquisitely so. In some cases the parts are a little swollen and the color is darker; there may be a burning sensation in the peripheral distribution of the nerve, and if the case is severe, all the symptoms described in cases of injury to nerves (Fig. 3).

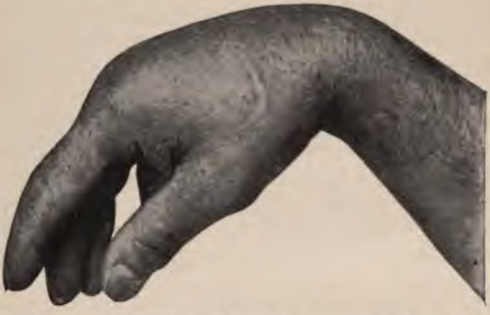

FIG. 3.—Characteristic position of hand in musculospiral palsy (Church).

In neuritis of the median the thumb, index-finger, and the palm of the hand are the seat of the burning pain. If the case is severe, glossy skin, bullæ, and changes in the nails, etc., may follow. (See Injuries to Nerves.)

In these cases of acute and subacute local neuritis the nerves in the upper extremity are more frequently affected than any others.

Diagnosis.—The distribution of the pain to one nerve; the peculiar pain; the burning sensation, etc.

Prognosis.—Most of these cases recover under treatment.

Treatment.—The actual cautery may be used. Iodid of potassium is sometimes used internally, but its utility is doubtful. Mild galvanism appears to give relief if used often enough. Hot-water applications are beneficial in the shape of douches. There should be complete rest of the part; for the relief of the pain phenacetin, acetanilid, or salicylic acid preparations may be used, but if the pain is very severe, they are not sufficiently effective. Aconitin sometimes gives relief. Morphin with atropin is most effective to relieve pain and secure sleep.

Multiple Neuritis.—This is an acute or subacute neuritis affecting all four extremities, and characterized by weakness *r paralysis, accompanied* by atrophy, pain, and tenderness.

Etiology.—This affection is eminently one due to toxic agents, either inorganic or organic, or it may follow exposure to cold and wet. Anemia is an important predisposing factor.

Of the inorganic poisons, mercury, lead, arsenic, copper, phosphorus, alcohol, carbon monoxid, arseniureted hydrogen, etc., are exciting causes. The organic poisons of the infectious diseases, notably beri-beri, diphtheria, typhoid, scarlet fever, measles, syphilis, pneumonia, and tuberculosis, are other exciting causes. Malaria among the animal parasitic diseases is a not uncommon cause. Diabetes as an acid intoxication is an allied causative factor.

There are four well-differentiated types now recognized on general etiologic grounds:

(1) *Motor Type.*—This is characteristic of the metallic poisons, alcohol, and exposure.

(2) *Sensory Type.*—This follows many metallic poisons, the infectious diseases, diabetes, etc. This type affects the sensory neurons and causes much incoördination. In some patients, syphilitics particularly, it is claimed by competent observers that the mercurial treatment may bring about a pseudotabes. Other forms of this type are frequently mistaken for locomotor ataxia and *cured.*

(3) *Epidemic Types.*—Seen in beri-beri.

(4) *Acute Pernicious Type.*—This is, perhaps, identical with Landry's paralysis.

The commonest form is perhaps alcoholic multiple neuritis.

Alcoholic Neuritis.—At least two-thirds of the cases occur in women. The lower extremities are the most affected, but it not infrequently affects all extremities, and the pneumogastric and the muscles of the face may be involved. Its onset is usually gradual. A creeping, tingling sensation with soreness is felt in the extremities; soon motor symptoms appear; the extensors are the first muscles to be paralyzed, producing in the lower extremity dragging of the foot, drop foot, and in the upper, wrist-drop. There are sharp, shooting pains in the parts affected. There is marked tenderness of the muscles to pressure if the extremities are seized suddenly or grasped firmly. The patient screams out with pain. This is commonly observed in women who are apt to be emotional and exaggerate their sufferings. There is a painful tingling in the soles of the feet, which is much increased by standing. The patients walk with a "steppage" gait and great caution, fearful of increasing the pain. The paretic extremities are edematous and bluish, owing to defective circulation. The tendon-reflex is usually lost. The mental symptoms accompanying alcoholic neuritis are described in Section VII. There may be some muscular wasting, but it is not great in the majority of cases, the muscles becoming flabby and soft. Muscular atrophy may occur in the cases which become chronic. Then it is *en masse*, as a rule, and there is partial reaction of degeneration. There may be retarded and perverted sensibility. In severe cases contracture may occur.

Diagnosis.—The alcoholic history; the association of the motor weakness with the characteristic sensory symptoms in the extremities; the painful tingling in the feet when the patient stands; and the excessive tenderness in the muscles make the diagnosis.

Prognosis.—A large proportion of these cases recover in from six months to one year.

Treatment.—Complete abstinence from alcoholic liquors, ample nutritious diet and keeping the extremities warm; hot and cold douches; tonics—large doses of quinin and strychnin. For the relief of the pains some of the remedies recommended in acute peripheral neuritis. Electricity is invaluable.

Diphtheric Neuritis.—Diphtheric paralysis occurs usually several weeks after the disappearance of the diphtheric symptoms, and during the period of convalescence or after it. The muscles of the pharynx and deglutition and of the neck are the most commonly affected; the voice becomes thick and indistinct; there is difficulty in swallowing; perhaps fluids come out through the nose in efforts to swallow, owing to paralysis of the soft palate. The paralysis in the muscles of the neck may be so decided that the child cannot hold the head erect. The paralysis of the extremities may be so slight as to cause only an unsteadiness of walk. One or more of the eye muscles may be paralyzed, and it is said one or both of the facial nerves may be affected. In severe cases *the paralysis may* be very decided and reflex action may be abolished, and there may be some disorders of sensibility, but they are not marked. None of the pain observed in alcoholic neuritis is present. The appearance of paralysis has no relation to the severity of the diphtheric manifestations in a large number of the cases. Paralysis is known to follow very mild cases of diphtheria. In some cases the sore throat and constitutional symptoms are so mild that the children run about and it is not suspected that they have diphtheria.

Diagnosis.—The diphtheric history. The gradual development of a paresis during or after convalescence; its great tendency to affect the muscles of deglutition and the neck; its great frequency in children as compared with adults; the absence of marked sensory symptoms.

Prognosis and Treatment.—The uncomplicated cases usually recover after some weeks. If the pneumogastric is very much involved or there is bronchitis or pertussis, the prognosis is grave. Tonics and nutritious diet, with cod-liver oil, fresh air if the weather admits of being out-of-doors, and at the same time warm clothing.

Lead Neuritis.—This occurs in persons who have been exposed to lead, such as workers in manufactories of white lead, and painters who are not careful to keep their hands clean. It first shows itself by increasing anemia and constipation, attacks of abdominal pain, and "lead colic." There may be some pain in the joints and limbs, and a gradually approaching paralysis of the upper extremities—usually both. The extensors of the forearms are most affected, so that when the arms are held out, the hand hangs down and cannot be extended from the wrist—"wrist-drop." The common extensors of the fingers are first involved; then the extensors of the index and little finger and of the wrist. The supinator longus is not paralyzed unless in cases of exceptional severity. There is swelling of the back of the wrist from prolonged overflexion. The lower extremities may be affected, but these cases are quite uncommon. The tongue is coated, breath offensive, and there is usually a characteristic blue line at the junction of the teeth and gums. There are fewer sensory symptoms, pain, etc., than in alcoholic neuritis. There may be disturbances of vision due to optic neuritis or atrophy of the *optic nerves*; and even mental impairment has been observed, but it is not frequent. A certain amount of tremor may exist.

Diagnosis.—The exposure to lead; the peculiar abdominal pain; the wrist-drop with conservation of power in the supinator longus; the blue line at junction of gums with the teeth; the intense pallor, etc.

Prognosis.—These persons usually recover after a number of months if the cases are not of great severity.

Treatment.—Sulphuric acid or some of the alkaline sulphates to wash out and eliminate the lead which may still be in the intestinal canal. Later, iodid of potassium in moderate doses. If there is much abdominal pain, it should be relieved with opium or codein. The skin should be kept active by moderately warm baths and rubbing; the mouth and teeth should be brushed twice a day; faradism or galvanism to the paralyzed muscles; later, to relieve pallor, mild ferruginous tonics.

CHAPTER III.

PARALYSIS OF MUSCLES SUPPLIED BY THE PERIPHERAL MOTOR NERVES.

Such paralyses may be the result of injury (*q. v.* p. 21) already discussed, of neuritis, or of some disease in the nerve or contiguous structures giving rise to pressure or destruction. Many of these paralyses may be due to nuclear lesions, and in many instances it may be impossible to diagnosticate the presence of a peripheral or a nuclear lesion.

Paralysis may occur in any of the nerves supplying the eye muscles, but paralyses of the third and sixth nerves are the most common.

Paralysis of the Oculomotor.—This is most commonly caused by syphilitic lesions in the course of the nerve. It may occur after diphtheria, or in persons suffering from diabetes or from intracranial tumors; from disease of the nucleus of origin in the pons, or from tumors in the substance of the brain injuring the nerve-tract.

If the entire nerve is paralyzed, there is drooping of the eyelid; and if it is extreme, the upper lid cannot be raised, owing to paralysis of the levator palpebræ superioris, causing a condition called ptosis. The superior rectus and the internal rectus are also paralyzed, and the eyeball is turned outward.

But there may be paralysis in only a branch of the nerve, for example, affecting the internal rectus alone, or ptosis and paralysis of the superior rectus; and there may be dilatation of the pupil, with loss of reaction to light. If the paralysis is confined to one eye, it is due to a lesion in the course of the nerve after its exit from the brain; if the lesion is in the nucleus of origin, the paralysis may be on both sides—there will be double ptosis, and both eyeballs will turn outward. If there is tumor in the midbrain, there will be the same condition. (See Diseases of the Brain.)

The **prognosis** in these cases will depend upon the pathologic condition which gives rise to the paralysis. If due to syphilis, recovery may be expected under antisyphilitic treatment; if due to non-syphilitic intracranial or intracerebral tumors, the prognosis is unfavorable. When it occurs in the course of diabetes, it may pass away. This may also occur in some of the cases of locomotor ataxia, but in others it remains permanent.

Treatment.—Electricity is sometimes applied in these cases. If there is evidence of syphilis, large and increasing doses of iodid of potassium with active mercurial treatment.

Paralysis of the external rectus or sixth nerve has the same causes as operate in paralysis of nerves to the other muscles of the eye; it gives rise to convergence of the eyeball and double vision, or diplopia.

Testing these eye-muscles can be done easily and satisfactorily for a rough examination by having the person, while the head is fixed, look at your finger or a pencil held up in front of him, and moving it first to one side, then to the other, upward and downward, at the same time observing the action of the eye muscles.

Peripheral Facial Paralysis (Bell's Palsy).—This is a paralysis in the distribution of the facial nerve in part or entire.

Etiology.—Exposure to cold appears to be a frequent cause;

it may occur at all ages, but is most common between twenty and fifty years of age. Persons who are the subjects of some nervous disturbances, such as hemicrania, headaches, neuralgia, etc., are more disposed to this form of paralysis. It occurs suddenly in a large number of the cases which are supposed to be due to cold or rheumatism. It may occur as the result of severe injuries to the head, causing fracture at the base of the skull, from saber cuts or wounds by bullets injuring the nerve. It may be the result of the pressure of tumors in the neighborhood of the parotid gland, from suppurative otitis with extensive disease of the bone. It may arise from the pressure of syphilitic periostitis in the bony canal or syphilitic meningitis and gummata, or in the course of the development of neoplasms (sarcoma and other tumors) at the base of the brain; but the symptoms then are not single paralysis of the facial nerve; other cranial nerves are involved, and other symptoms indicative of tumor are present.

Symptoms.—There may be some premonitory symptoms, such as a general feeling of discomfort, chilliness, some headache, slight pain about the ear or the side of the head, slight noise in the ear, or tingling sensation in the side of the tongue. Often the person awakes in the morning to find the face paralyzed on one side, or his attention is first called to it by some person. The entire side of the face is paralyzed, the nasolabial fold is obliterated, the lower eyelid droops down so that the tears run over the cheek; there is a peculiar stare about the eye, owing to the paralysis of the orbicularis palpebrarum; that side of the forehead looks smoother than the other; all wrinkling of the skin is obliterated. If the person is asked to close the eyes tightly, he cannot close the affected eye; the ball is only partially covered. If the tongue is protruded, the upper lip on that side is observed to hang lower than the opposite side; it touches the tongue. In making an effort to whistle, the lips on the affected side do not contract as they do on the opposite side. The healthy side appears drawn up and leads the patient and friends to think that it is the affected side. This is due to the great contrast between the healthy muscles in tone and the flaccid paralyzed muscles on the other side. If the nerve is diseased external to the Fallopian canal, all the muscles of the face on that side are paralyzed; if in the Fallopian canal and below the point at which the chorda tympani is given off, the muscles of the external ear in addition are paralyzed. If the disease is between the point at which the chorda tympani is given off, and the point of origin of the small branches of the stapedius, there are, in addition, abolition of taste in the anterior two-thirds of the tongue on that side and diminution of salivary secretion; pain of a tingling and burning character in these parts may be present. If the geniculate ganglion itself is diseased, all the previous signs are present, and in addition paralysis of the soft palate and displacement of the uvula. At the very beginning of the paralysis there is an increased irritability to the faradic reaction, but this is, as a rule, soon lost, and the reaction of degeneration for galvanism develops. During the course of the disease there is a good deal of annoyance and distress, due to inability to close the eyelids; dust is blown in, and in high dry winds the tears are rapidly evaporated; the inability to cover the ball from time to time allows it to become dry, irritated, and painful. This is much less troublesome in moist, damp, foggy weather. The lip is in the way and often gets bitten when an attempt is made to bite or chew. Later, if the paralysis is not completely recovered from, there is a

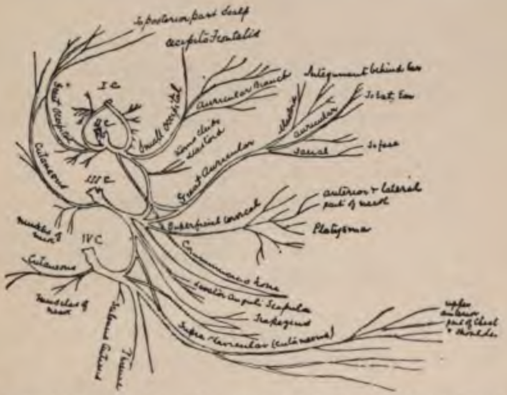

FIG. 4.—Cervical plexus of nerves (after Flower—Keen edition).

certain amount of contracture in the paralyzed muscles with a feeling of stiffness in them.

Diagnosis.—In peripheral facial paralysis all the muscles supplied by the facial are paralyzed. If the person is directed to close the eyes, he cannot close the eyelids on the paralyzed side. In the facial paralysis from cerebral disease only the lower facial muscles are affected, and he can close both eyes equally well. There is an exception to this, and it is when there is a lesion in the pons or medulla ; but these cases are exceedingly rare. (Refer to chapters on Diseases of the Brain.)

In cases due to fracture at the base of the skull there will be a history of severe injury, with perhaps bleeding from the ear, etc. From disease of the bones of the ear there will be a history of old suppurative inflammation of the middle ear, with an offensive bloody discharge.

In the paralysis due to syphilitic disease there will be headache and a slowly advancing paralysis—not sudden, as is the case with the common variety ; also a history of syphilis, and there is very likely to be paralysis of some of the other cranial nerves—those supplying the eye-muscles are much oftener affected.

Prognosis.—In the cases due to fracture at the base of the skull, to caries of the temporal bone, and to intracranial tumors the prognosis is unfavorable. In those cases clearly due to syphilis, under appropriate treatment, recovery is the rule. In the cases due to cold, recovery is complete in some of the cases after a few weeks ; in the more severe cases recovery occurs only after six or eight months, and there is very apt to remain some slight impairment of the muscles and nerve on that side.

Treatment.—In all cases salicylic acid preparations should be given in the first week, especially if there is any pain. If the patient is in poor physical condition, tonics may be given. Mercury and potassium iodid frequently give relief in syphilitic cases. Later, regeneration is aided by galvanism, either continuous or interrupted. Cases due to intracranial tumors, such as those of the cerebello-pontine angle, require operation. Where a middle-ear disease is the cause, the local condition *requires treatment.*

Paralysis of the median nerve causes inability to pronate and grasp objects with the hand, except with the two fingers which are supplied by the ulnar nerve. There may be a good deal of anesthesia in the distribution of the nerve. Its most common cause is injury.

Paralysis of the ulnar abolishes the power to flex the last two fingers, of separating or of compressing them against the middle finger, of flexing the first and extending the second and third phalanges of all the fingers, and of adducting the thumb and placing it against the metacarpal bone of the index-finger. If the interossei and lumbricales are alone paralyzed, the combined traction of the extensors and flexors of the fingers produces hyperextension of the first and flexion of the last two phalanges, and the hand assumes a claw-like appearance.

Paralysis of the Musculospiral Nerve.—This is most frequently due to injuries as it winds around the humerus. One of the most common causes is compression of the nerve

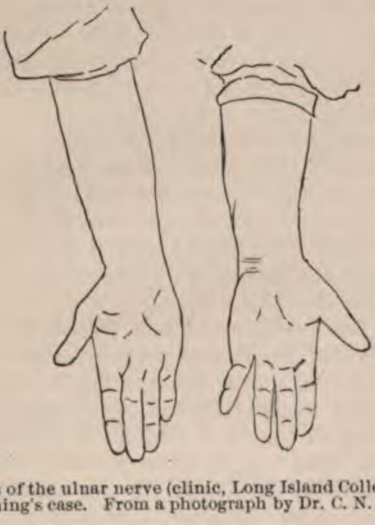

FIG. 5.—Paralysis of the ulnar nerve (clinic, Long Island College Hospital; Dr. Wm. Browning's case. From a photograph by Dr. C. N. Hoagland).

from lying on the arm in such a way as to press against some hard substance. This frequently occurs in drunkards, who fall in almost any place—on a hard floor or on the stones in the street. When they awake the next morning, the arm is found paralyzed; they cannot extend the wrist and the fingers; the thumb is flexed and abducted; they are unable to supinate the forearm; and it will be found that the supinator longus is paralyzed. This can be shown by having the patient flex the forearm upon the arm, and make resistance to passive extension. If, while one makes the effort to extend it, a finger is placed on the supinator longus just below the elbow, it will be found to be quite flaccid—paralyzed. In plumbism the paralysis in the upper extremities is in the distribution of the musculospiral, and it presents, therefore, in that respect the same symptoms as in the condition under consideration. This difference in the condition of the supinator longus can be used as one of the points of differential diagnosis. In lead paralysis it is not involved; in paralysis from pressure it is. It is paralyzed by improperly adjusted crutches and by injuries which partially or entirely sever the nerve. In these cases there is anesthesia on the back of the hand and forearm.

Paralysis of the circumflex nerve is shown by paralysis of the deltoid. The arm cannot be raised upward or outward; the muscle is observed to remain relaxed in these efforts, and it frequently undergoes atrophy. Its most common cause is injury by falls or blows, and the muscle is more or less injured at the same time. There may be some slight aching about the shoulder.

Paralysis from Injury of the Brachial Plexus (Obstetric Paralysis; Duchenne-Erb Paralysis).—This is a form of paralysis in one arm, occurring in very young children, from injury to the fifth and sixth cervical nerves by forcible traction on the head and neck during delivery, or from pressure, when no interference with labor has been made. The muscles paralyzed are the deltoid, biceps, brachialis anticus, infraspinatus and supinator longus, and occasionally the extensors of the hand. The arm hangs by the side; it cannot be raised from the shoulder or flexed at the

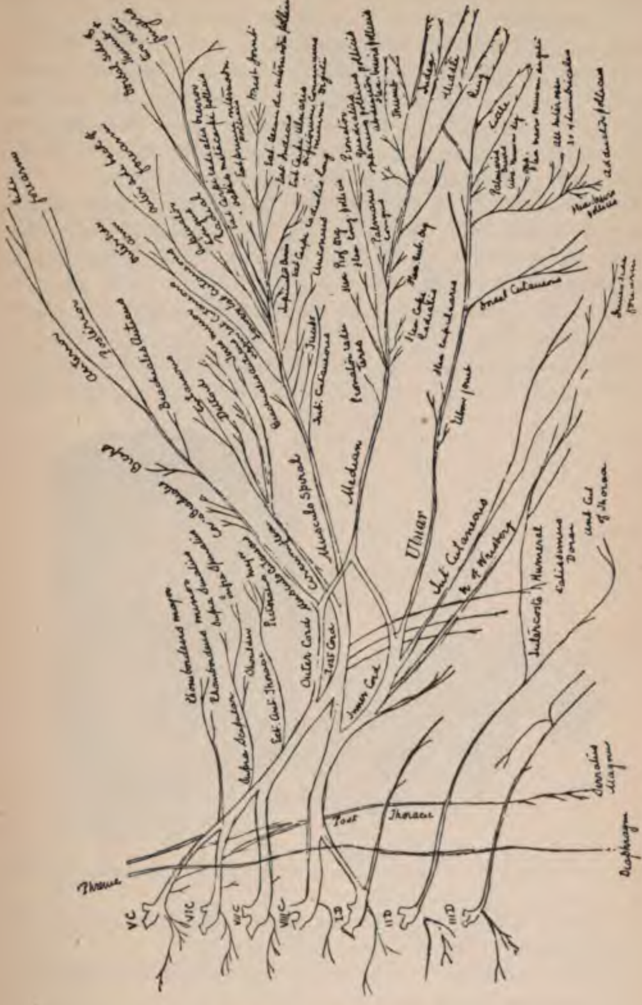

FIG. 6.– Brachial plexus.

elbow, but the forearm and hand can be moved. In some cases the hand is flexed and rotated inward; there is anesthesia on the outer side of shoulder and arm (see Fig. 6).

In some of the cases of obstetric paralysis the nerves supplied to the brachial plexus from the seventh cervical and first dorsal roots are injured as well as those from the fifth and sixth cervical roots; the result is that the muscles of the entire upper extremity are paralyzed (see Fig. 7).

Erb considers the **prognosis** in these cases unfavorable; Starr has seen some of them recover spontaneously. Recovery has occurred in all those cases in which the paralysis is confined to the upper-arm muscles, while in those cases in which all the muscles of the extremity are paralyzed recovery has been slow.

Treatment consists of galvanism to the affected nerve and muscles and friction. Starr recommends keeping the elbow flexed, and not allowing the hand to hang down, to prevent overstretching of the shoulder ligaments.

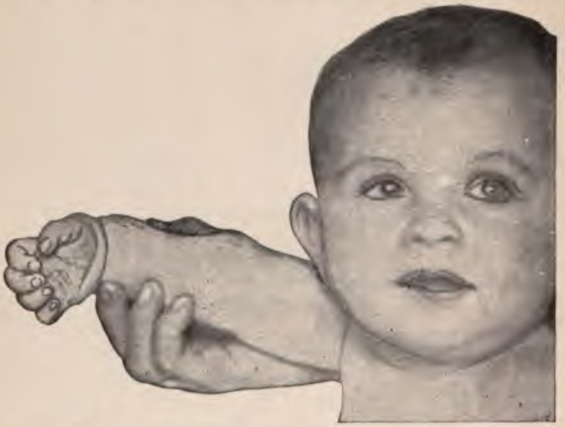

FIG. 7.—Brachial palsy from birth-injury, due to traction in axilla (Church).

Surgical treatment by nerve anastomosis offers some hope in the persistent cases (see Fig. 7).

Paralysis of the muscles supplied by the seventh cervical

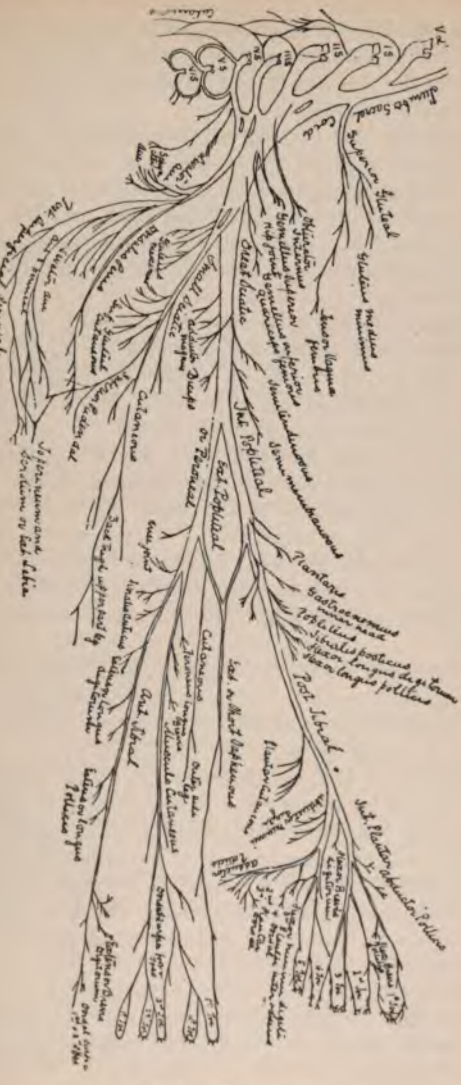

FIG. 8.—Sacral plexus.

and first dorsal may occur from injury or disease of the nerves at their roots or in their course. This variety of paralysis is confined to the muscles of the hand and forearm, constituting the Klumpke paralysis type.

Paralysis of the laryngeal branches of the vagus may occur from injuries or compression of these nerves by tumors in the neck or mediastinum, by enlarged lymphatic glands, aneurysms in the arch of the aorta, carotid, and subclavian arteries. It is met with sometimes as a symptom in hysteria, in disseminated sclerosis, in bulbar paralysis, and in locomotor ataxia.

Symptoms.—It may give rise to difficulty in breathing, difficulties in speech depending upon the muscles paralyzed; or there may be paroxysms of spasmodic coughing, as when the nerve is irritated by the pressure of tumors or aneurysms or as in locomotor ataxia (see that disease).

Paralysis of the lumbar and sacral plexus and its branches may arise from injuries, diseases of the vertebræ, tumors, abscesses, fracture of the thigh, etc. (see Fig. 8).

Paralysis of the anterior crural nerve causes inability to flex the thigh on the hip and extension of the leg. If sensory disorders are present, the anesthesia extends over the lower two-thirds of the thigh, the knee and inner side of the leg and foot.

If the obturator nerve is paralyzed, adduction of the thigh and crossing this leg over the other are impossible; outward rotation of the thigh is difficult. Anesthesia is on the inner side of the thigh as far as knee.

In paralysis of the musculocutaneous and anterior tibial the foot cannot be flexed, but hangs down; in walking the toes drag, and the person is in danger of tripping; to avoid this, the leg is lifted very high by flexion of the thigh on the hip and at knee. This is a condition frequently observed in infantile and other spinal paralyses. Sensory disorders, if present, are in the anterior and external part of the leg, dorsum of the foot, and toes.

In paralysis of the trunk of the sciatic all the muscles of the leg and foot are paralyzed. There may be all the trophic disorders described under injuries of nerves, and muscular *atrophy may follow.*

SECTION II.

DISEASES OF THE SPINAL CORD AND MEDULLA.

To present a complete nosology of spinal-cord lesions is an extremely difficult matter. The lesions are so apt to overlap, and it is only in the initial stages or in those rare instances in which one type of structure alone is affected that the simpler uncomplicated forms of spinal-cord affections are seen.

For purposes of diagnosis eight types of lesions may be differentiated, according to the anatomic involvement. These are:

1. The anterior horn motor nuclei group—muscular paralysis and atrophy syndrome.
2. Anterior horns and lateral column group—muscular atrophy and spasticity.
3. The posterior column group—sensory and ataxic syndrome.
4. Anterolateral column group—paretospasmodic; contractions and tremor syndrome.
5. Posterior and lateral column group—ataxia and spasticity syndromes.
6. Central posterior gray substance—vasomotor disturbances; dissociation.
7. The anterior and posterior horn; all the nuclei—vasomotor symptoms; muscular atrophy; dissociation; sensory syndrome.
8. Diffuse diseases of the spinal cord—myelitis; multiple sclerosis.

To these a further group may be added of those cases in which there is secondary degeneration of the descending tracts from involvement of the cerebral substance.

CHAPTER I.

INVOLVEMENT OF MOTOR NUCLEI—ANTERIOR POLIOMYELITIS.

ANTERIOR poliomyelitis may be acute or chronic. The lesion may be limited to a few nervous structures, or it may involve the entire series in the cord and medulla, as in Landry's paralysis. Its situation may vary widely—a leg center; an arm center; speech center; oculomotor centers; any or all or portions of these may be involved in the process.

The classic type is that seen in children—the acute anterior poliomyelitis (acute paralysis) of infants and children.

INFANTILE SPINAL PARALYSIS (Acute Poliomyelitis Anterior).

Etiology.—It occurs in children during the first ten years of their life, but is most common from six months up to three years of age. Boys are more often affected than girls; but Gowers thinks this is only so in those cases which occur under two years of age. Sinkler, of Philadelphia, first pointed out that the disease was very much more frequent in summer than in winter, and that the largest number occur from May to September. Cold has always been assigned as a cause, but Sinkler's observations throw doubt upon this. The children are often apparently well when they are suddenly attacked; it may occur after diarrhea or some of the eruptive fevers. It seems pretty well established at the present time that this disease is due to a bacterial infection, and the pathologic lesions are the result of the poisoning of the cells by the toxins. Epidemic outbreaks of this disease have been reported from many places in the last few years.

Symptoms.—The onset is usually sudden. As premonitory symptoms there may be some languor and irritability. There is usually more or less fever of short duration. The attack may be ushered in by a convulsion, or the child may be put to bed apparently quite well. It is restless during the night, and in the morning it is found to be paralyzed in some of its extremities. The lower extremities are most commonly affected. At first there is a great deal of sensitiveness about the paralyzed extremities; if they are handled, the child screams; this lasts a few hours or a few days, and subsides. After a week or so some of the paralyzed muscles may recover, leaving others permanently weakened (see Fig. 9).

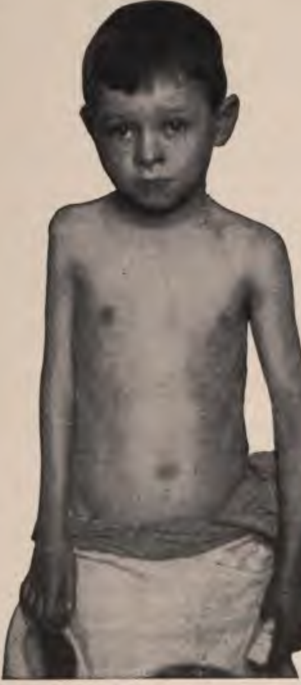

FIG. 9.—Deformity of upper extremity and thorax after poliomyelitis anterior acuta (Church).

The distribution of the paralysis is variable; the lower extremities are the most frequently affected—one or both legs; the upper extremities, the muscles of the neck and back, may be paralyzed; or it may be hemiplegic in distribution; but this is rare. There are no sensory disorders. Reflex action *is lost in the* paralyzed parts. There are no rectal or vesical disturbances. The parts which remain paralyzed soon show trophic disturbances. The muscles begin to atrophy, the parts are bluish and cold, the circulation is defective, and chilblains form easily. Whenever there is any undue pressure from a shoe or brace, sores form. The muscular atrophy becomes extreme in some cases; as a consequence, deformities arise. Talipes equinus and varus are the most common. These deformities are brought about by one of three causes, but most probably by a combination of some of these conditions: (1) It is believed by some that they are due to the predominant action of the healthy muscles; (2) Volkman believes it is due to the weight of the limb itself; (3) that the healthy muscles are constantly shortening, owing to the absence of the power of their antagonistic muscles.

As the child grows, the paralyzed limb does not develop in keeping with the healthy one—there is retarded development. The bones are shorter and smaller, so that when the child grows up, the paralyzed extremity is shorter and smaller than the others. The electric reactions for faradism are very much diminished or lost; the galvanic reaction varies from simple diminution to complete reaction of degeneration, or even entire absence of reaction.

Pathologic Anatomy.—Autopsies early in the course of the disease are not frequent. In such cases the anterior cornua corresponding to the affected parts are found very vascular, the capillaries are distended, and there are minute extravasations of blood in the gray substance. The blood-vessels are surrounded by more or less dense perivascular infiltration with lymphocytes. The ganglion-cells are swollen, granular, and their processes indistinct; various grades of acute parenchymatous disintegration are present. Chromatolysis and destruction of the ganglion-cells are present. In autopsies made many years after the onset of the disease, the anterior horn is shrunken, the ganglion-cells are absent, the surrounding tissue is dense, and fibrous tissues predominate.

Prognosis.—These children rarely die in the acute stage; death usually occurs years after, of some other disease. Improvement may take place in some of the paralyzed muscles after a number of weeks; this cannot be predicted. Occasionally complete or partial recovery occurs.

Treatment.—Tonics, cod-liver oil, attention to the diet, and general hygienic management, sponging with cold water, etc. For a long time galvanism has been used on these paralyzed muscles. If tried, it must be with the hope of keeping the paralyzed muscles from wasting, and improving the condition of the circulation and nutrition; but in this one will often be disappointed. Massage will be of service. Later, if deformities arise, the orthopedic surgeon will aid by dividing the tendons and placing the limbs in a comparatively useful position.

ACUTE AND SUBACUTE SPINAL PARALYSIS IN THE ADULT.

This may be acute or subacute in its onset; it has a very great resemblance to acute myelitis of the anterior horns in children; it is evidently the same disease, with some slight modifications in symptomatology. It is to be borne in mind that it is almost impossible to separate this condition from acute polyneuritis.

Etiology.—It occurs in adults; so far as is known, its cause is similar to that operating in children.

Symptoms.—The onset may be somewhat sudden. There may be some elevation of temperature, tingling and pricking sensations about the extremities, with a feeling of numbness; some aching in the back; and in from twenty-four to forty-eight hours paralysis, more or less great, comes on, or it may develop much more slowly. It most commonly affects all extremities, but in a proportion of cases it is confined to the lower extremities—paraplegic. Rarely the face, eyes, tongue, and muscles of deglutition are affected. There is in some cases a very slight impairment of tactile sensation at first, but it is not lasting. Other than this there are no true sensory disorders; there are no disturbances of the functions of the bladder and rectum; the paralyzed muscles may present fibrillary contractions, but this is observed only in the subacute cases. There is loss of faradic reaction and reaction of degeneration to galvanism. There may be some feeling of constriction about the body or limbs. There is quite a marked tendency for the paralyzed muscles to recover, and in a large proportion of the acute cases recovery is complete; but in those cases where all the muscles do not recover, muscular atrophy occurs and may become extreme, giving rise to contracture and deformities. The circulation is poor; the extremities are purplish and cold.

Prognosis.—The same as in children.

Diagnosis.—The more or less rapid onset of motor weakness without true sensory symptoms, the subsequent atrophy and deformities, absence of bladder and rectal disorders, disturbance in the electric reactions, etc.

Pathologic anatomy is similar to that of acute myelitis of the anterior horns in children.

Treatment must be such as is adopted in children.

ACUTE ASCENDING PARALYSIS (Landry's Paralysis).

Etiology.—It is known to follow typhus and typhoid fever, variola, splenic fever, and many other types of infection. The most likely hypothesis is that of an acute infectious disease.

Symptoms.—There may be premonitory symptoms, such as aching and soreness, with tingling in the parts; headache and backache; or it may appear during the course or at the onset of some other disease. The first definite symptom is usually a weakness in both legs, which increases rapidly—sometimes in a few hours—to complete paralysis. It soon extends to the arms; as the lesion extends up to the medulla there occurs paralysis of the diaphragm and neck muscles. There is difficulty in swallowing and speaking, owing to paralysis of the muscles of speech and of deglutition. The extremities are flaccid and powerless; there is no muscular atrophy; there are no alterations in the electric reactions; the reflexes are lost; there are sensations of tingling, but no loss of tactile sensibility as a rule. There are no bladder or rectal symptoms; no bed-sores; the mind is not disturbed. It usually runs a rapid course of from three to ten days in death by arrest of respiration, owing to the implication of the medulla oblongata.

Pathology.—The changes in the spinal cord which give rise to this rapidly increasing paralysis are not fully made out.

In many cases the lesions of neuritis are alone to be found; diseased nerves and healthy medulla, in others the ganglion-cells, have been found affected, and the peripheral portion of the motor neuron found intact. The pathologic picture may then be that of an acute neuritis or an acute poliomyelitis. The most recent researches all seem to show an inflammatory exudative process in the gray matter of the spinal cord.

Diagnosis.—The great rapidity with which the symptoms appear is characteristic. Acute ascending paralysis has some resemblance to the following diseases, but from which it is easily differentiated: Acute poliomyelitis anterior is often quite rapid in its development, and when all extremities are involved, it may present the general appearance of Landry's paralysis. In acute poliomyelitis anterior there is not the rapid involvement of the medulla which there is in this disease. The faradic reaction is lost in poliomyelitis and it is not in Landry's paralysis. Poliomyelitis is not a fatal disease. It can hardly be mistaken for spinal meningitis, in which the paralysis is not rapid in its development; the prodromal stage is much longer; and the most distinctive symptom is pain, often of great severity, in the muscles of the back and extremities, and radiating along the spinal nerves which are given off from that portion of the cord which is the seat of greatest inflammation. The disease ought not to be mistaken for polyneuritis even in its most rapid forms. The onset and progress of Landry's paralysis are always more rapid even than those cases of diphtheric paralysis which are sometimes generalized, and in which, as in Landry's paralysis, there are no sensory symptoms. In diphtheric paralysis the muscles about the throat and neck are affected very early—in fact, they are usually the first to show disease; it is the reverse in Landry's paralysis. In the other forms of polyneuritis the sensory symptoms are more decided and lasting. There is tenderness along the nerve-trunks, even in cases of acute infectious neuritis. It remains to be seen if there is not a lesion in the central nervous system, as well as in the peripheral nerves—in the so-called acute infectious neuritis. It must be remembered that in all probability changes in the spinal cord and peripheral nerves are present in those cases which we now think are of infectious origin.

Prognosis.—Unfavorable; it is a rapidly fatal disease. A few cases are reported as recovered.

Treatment.—Up to this time no treatment has been of much service.

Bibliography.—Bailey and Ewing, "A Contribution to the Study of Acute Ascending (Landry's) Paralysis," New York Medical Journal, July 4, 1896. A full list of publications up to this date will be found in this article. Déjérine and Thomas, Maladies de la Moelle, 1909. Oppenheim, Nervenkrankheiten, 1908.

CHRONIC MYELITIS OF THE ANTERIOR HORNS OF THE SPINAL CORD (Progressive Muscular Atrophy).

It attacks males oftener than females. It is thought to be caused by cold, excessive physical exertion, injuries, etc., but it often occurs without the possibility of assigning a cause—apparently as a degenerative process. As a general rule this disease occurs sporadically, but an hereditary form is known.

Symptoms.—It begins slowly as a weakness, usually in the upper extremity, and more frequently in the right hand. There may be some aching in the hand. Soon the muscles of the hand begin to atrophy. At other times the symptoms come on less slowly, with aching in the muscles and pains; the disease progresses more rapidly, and the atrophy is more generalized. The atrophy extends from one muscle or one group to the other. In cases where the shoulder muscles are much wasted, the arms hang at the sides and the hands have a flattened, flabby appearance. In some cases the legs are involved in the disease, but the atrophy is never so marked as in the upper extremities. As the disease progresses the medulla may be involved, when there is, in addition, bulbar paralysis; the tongue is atrophied, presents a shriveled, shrunken appearance, the muscles of the face and of deglutition are weak, there is indistinctness in speaking, and later much difficulty in swallowing, owing to the paresis of the muscles of deglutition. In extreme cases much distress is caused by fluids passing up through the posterior nares and out of the nose (see Figs. 10, 11).

Fibrillary contractions are constant in these atrophied muscles, especially in the tongue. The tendon-reflex is lost in all those cases in which the dorsolumbar cord is involved. The faradic and galvanic reactions may be simply diminished, but usually reaction of degeneration is obtainable in some muscles. There are no sensory disorders in this disease; no bladder or rectal disturbance; the parts are cold, and the circulation is impaired.

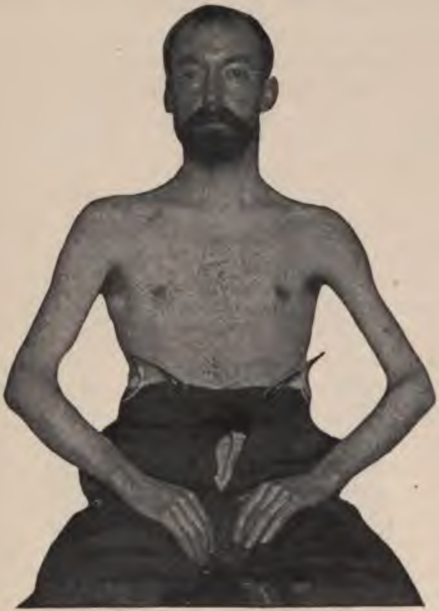

FIG. 10.—Scapulohumeral type of progressive muscular atrophy. Note the angle on right side of neck with lengthening of the neck, due to wasting of the trapezius, and the peculiarity of the deltoid (Church).

Pathologic Anatomy.—Atrophy, granular pigmentation, and disappearance of the ganglion-cells of the anterior horns. There are some thickening and change in the neuroglia, with dilatation of the blood-vessels. In fresh frozen sections of the cord granular corpuscles may be found. The anterior horns later become shrunken; the anterior roots are somewhat atrophied. The disease is believed to begin in the anterior horns and its large ganglion-cells; the anterior roots are diseased secondarily. The anterior horns, and more especially its ganglion-cells, are the trophic centers for the anterior roots, motor nerves, and muscles. The disease of the anterior roots and the muscular atrophy are in relation to the extent of the lesion in the anterior horn; the slow and gradual disease of the ganglion-cells explains the slowly progressing muscular atrophy, and as one portion after another of the spinal cord becomes affected, the muscles of which it is *the trophic* center waste.

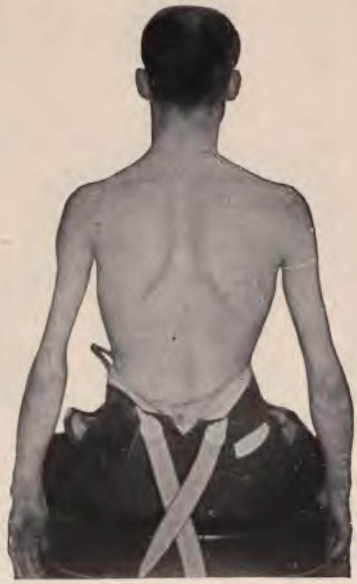

FIG. 11.—Scapulohumeral type of progressive muscular atrophy. Note the angle on right side of neck with lengthening of the neck, due to wasting of the trapezius, and the peculiarity of the deltoid (Church).

Prognosis.—Unfavorable. In some cases the progress of the disease is of many years' duration; in others it is more rapid—one, two, or three years; and if bulbar symptoms are added, death may occur sooner.

Treatment.—No treatment has exercised much influence over the progress of this disease. Tonics, cod-liver oil, and galvanism are indicated. Avoidance of the use of the muscles appears to have some influence in retarding the atrophy and prolonging the miserable existence of the person.

The Peroneal Form of Herbert Tooth.—This disease is described here, although at the present time its exact place in the two large groups of muscular atrophy is not certain, as no pathologic findings have shown if this be a disease depending upon a nervous or a muscular lesion; but there are many indications which justify its being placed, for the present at least, with the muscular atrophies of nervous origin. That it has an hereditary basis has been well established. It was first described by Charcot and Marie in 1886, and simultaneously by Herbert Tooth in England. It may begin from very early childhood to twenty years of age, and occasionally later. It begins simultaneously in both lower extremities as a progressive weakness and difficulty in using them; the muscles of the foot and leg begin to atrophy. It is a wasting of individual muscles and progresses slowly; sooner or later deformities arise due to paresis and atrophy of the muscles of the anterior tibial and peroneal groups. This atrophy may be confined to the lower extremities, or it may extend to the upper extremities, and there may be the deformity of the hand known as "main en griffe." The main feature is that the atrophy extends only from the knee or elbow peripherally. The thighs or arms are unaffected. There are no sensory rectal or vesical symptoms. The tendon-reflexes are present until a very late date. There are vasomotor disorders similar to those that are seen in acute poliomyelitis anterior. There may be partial or complete reaction of degeneration.

Prognosis.—The condition progresses slowly; death is caused by some intercurrent disease which may arise.

Treatment.—The same as that indicated for acute poliomyelitis anterior.

Bibliography.—Charcot and Marie, Rev. de Médicine, 1886; Herbert Tooth, Brain, 1888; and Thesis, 1886.

CHAPTER II.

DISEASE OF THE POSTERIOR COLUMNS.

Tabes dorsalis is the main representative of this type.

TABES DORSALIS (Locomotor Ataxia).

Etiology.—It is most common between thirty and fifty years of age; it affects males oftener than females. As exciting causes there are cold, damp, hardships of all kinds. It may follow some of the acute diseases; falls and injuries are said to act as exciting causes. Probably one may best divide the cases into two classes: (1) degenerative and (2) exudative. The latter, containing the majority, are syphilitic in nature. In regard to syphilis as a causative factor, Schütze reported a positive Wassermann reaction in the serum of tabetics in 79 per cent. and the same in the spinal fluid in 50 per cent.

Symptoms.—Pains, lancinating, lightning-like, or boring in character, are very early symptoms and are frequently mistaken for rheumatism, which they do not resemble in any way; they do not follow the course of any nerve-trunk, but shoot about in the various cutaneous branches. The lower extremities are generally first affected. These pains come on with great severity in paroxysms lasting a few hours or a few days and subsiding. They may precede the other symptoms for years. There is numbness in the feet and hands and in places about the legs; the feet feel thick and heavy, and the patient may be unable to recognize the quality of the substances he walks on. Sensibility is retarded. The patella tendon-reflex is lost; the pupils are contracted, usually alike, but one may be larger than the other; there is loss of reaction to light and preservation of reaction to accommodation (Argyll-Robertson pupil). Diplopia or double vision may occur, owing to paralysis of a muscle of one eye; it often comes on very suddenly, lasts a variable time, and may pass away, to recur again. It has been known to occur and pass away four separate times in one case. The ophthalmoscope may show atrophy of the optic nerves. Slowness in micturition occurs very frequently; sometimes there is slight dribbling of the urine (see Fig. 12).

Ataxia.—Persons find it difficult to stand or walk in the dark; they sway and stagger about, and this difficulty is increased if they cannot see where they are to put the feet, or if they have to walk on a narrow space or through a narrow doorway, or turn about quickly. This uncertainty is very much increased by making them walk with the eyes shut. If they stand with the eyes shut, they reel about from side to side and are in danger of falling (Romberg symptom). They are unable to touch accurately and directly objects with the feet or hands if all extremities are involved in the disease,

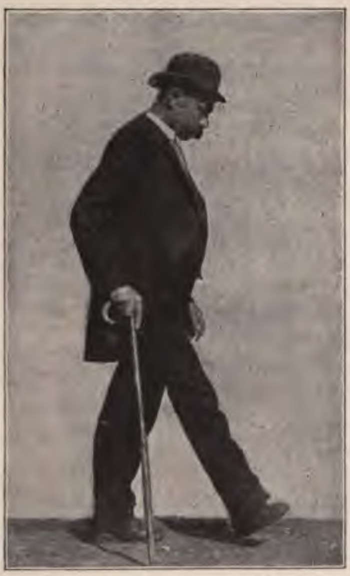

FIG. 12.—Gait in tabes. Observe overextension of supporting knee, rigidity of advancing leg, elevated toe, heavily descending heel, watchfulness of steps, and assistance by cane (Church).

especially if the eyes are shut. Attacks of vomiting—"gastric crises"—may occur, coming on suddenly, and lasting a few hours or a few days, and ceasing suddenly. There may also be nephritic crises simulating very closely nephritic colic; intense pain in the region of the kidney, with bloody urine; it ceases suddenly. They may also suffer what have been called "*intestinal crises*"; sudden attacks of looseness of the

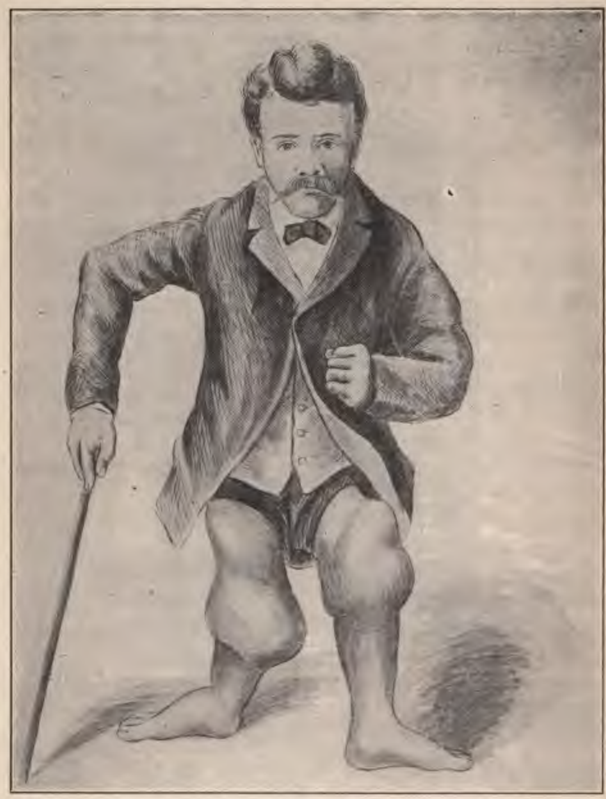

FIG. 13.—Arthropathy of both knees in a case of locomotor ataxia (Glorieux and Van Gehuchten, *Revue Neurologique*, September 15, 1895).

bowels; a kind of serous diarrhea, which also ceases suddenly. Laryngeal crises are also observed; sudden coughing seizures, with great difficulty in breathing; the face distressed and turgid; and the person appears in imminent danger of dying; it suddenly ceases. The suddenness of onset and of disappearance characterizes all these "crises." There may be permanent paralysis in one or more of the eye-muscles, and ptosis (paralysis of the levator palpebræ, so that the lid droops over the eyeball) may occur in one or both eyes. Paralysis of the anterior tibial group of muscles in one leg may occur, and may be passing or permanent. Muscular atrophy may occur in association with this disease, and it is usual in the lower extremities, but may also involve the upper; it may become extreme and give rise to contractures and deformities of the feet.

Apoplectiform seizures may occur in which the person is dazed, confused, and has difficulty in speaking; this is of temporary duration; it may be associated with hemiparesis (partial paralysis of one side of the body), or there may be a hemiparetic attack without the apoplectiform state. These hemiparetic attacks last a few hours or a few days, and pass away entirely. As trophic disorders, arthropathic disease of some of the large joints may occur. The joint becomes swollen and edematous without redness. There is usually very little or no pain. As the edema subsides dislocation may be discovered. Sometimes the joint remains permanently distended, but the eroded and absorbed heads of the bones can be felt (see Fig. 13).

The hip, knee, ankle, elbow, and shoulder are most frequently affected. Changes may take place in the long bones, so that they become very brittle, and spontaneous fractures may occur. These conditions are not very common. What has been called perforating ulcer of the foot may occur; it is usually in the great toe. Black and blue spots may occur under the skin or nails at the seat of severe lancinating pains or without; they are due to small hemorrhages. Deafness is observed in a few cases.

In a comparatively few cases mental symptoms occur; the memory becomes enfeebled; all the mental faculties are *impaired;* there is dementia. There may be some passing grandiose ideas, such as are found in general paralysis of the insane, but they are not usual; some passing delusions of persecution are more common; epileptiform seizures occur at this stage, and persons are liable to die in one of them. The duration of the disease is very variable. A great many persons will live ten or twelve years and even longer with it; others, and these are the exceptional cases, die in two or three years from convulsions; a rapid progress of the disease or a diffuse myelitis is set up, running a somewhat rapid course, or the person may die of some intercurrent disease, of which Bright's disease is the most common.

Pathology.—It has for some time been known that the anatomic lesion in this disease is in the posterior part of the cord. In recent years careful pathologic studies by Pierret, Westphal, Strümpell, Lissauer, Flechsig, Raymond, and others, and the embryologic studies of Flechsig and Bechterew, with the aid of improved technical methods, staining agents, etc., have added much to our information of the pathologic processes and their distribution, and have shown that the changes and the location of the lesion are not so simple as were heretofore believed. In an examination of sections from the spinal cord in an advanced stage of the disease the entire posterior columns in the fresh state will be found to present a grayish look. In hardened and mounted sections these columns may be found diseased in their entirety, but a study of a series of cases, the subjects of which have died early in the course of the disease, has shown that there is a pretty uniform localization of the beginning lesion in the column of Burdach. The changes in the columns, however, are possibly secondary to alterations in the posterior spinal ganglia. Obersteiner claims that the primary lesion is the pinching off of the posterior nerve roots, as they enter the cord, by the thickened indurated pia.

Autopsies made at various periods of the disease have shown that, later, other parts are involved, but that there is no uniformity in the succession of the parts subsequently diseased. The entire column of Burdach becomes diseased; the columns of Goll; the posterior roots and nerves; the zones of Lissauer. *Clarke's* columns may be found diseased; in some cases the *direct cerebellar tract.* The cells in the posterior horns may be atrophied, and occasionally Gowers' column is found degenerated. Many of these changes are, of course, secondary, notably the disease in Goll's columns, the cerebellar tract, and Gowers' columns; they are of the nature of secondary degenerations.

Histologically, the changes in the posterior columns which have been called "sclerosis" are really of the nature of a degenerative process; they are characterized by a gradual disappearance of the nerve-fibers, sometimes evidences of irritation in the vessels and neuroglia, but no active process, as a rule. There is a small amount of granular material scattered among the diseased tissue; occasionally large numbers of amyloid bodies. In advanced cases, where the nerve-fibers have largely disappeared, there is retraction of the neuroglia tissue, and the posterior column looks smaller and flattened; some posterior spinal meningitis may be observed, but it is not always present. The posterior roots are atrophied. The disease begins in the dorsal region usually, and there may be atrophy of the cells in Clarke's columns, and to some extent of those in the posterior horns. The extent and exact distribution of the lesions vary very much in different cases after the early stages. Changes have been found

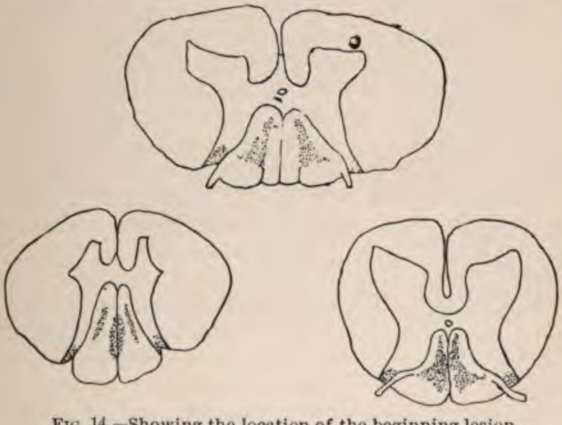

FIG. 14.—Showing the location of the beginning lesion.

in the peripheral nerves, but these are probably present only in the more advanced stages of the disease. These changes consist in breaking up of the myelin into irregular masses, which are scattered about the sheath of Schwann; there appears to be a tendency for this process of disintegration in the myelin to begin in the neighborhood of the constriction of Ranvier. The cerebrospinal fluid, obtained by lumbar puncture, always shows some increase in the number of lymphocytes it contains—20 to 90 per cmm. (normal 0–5).

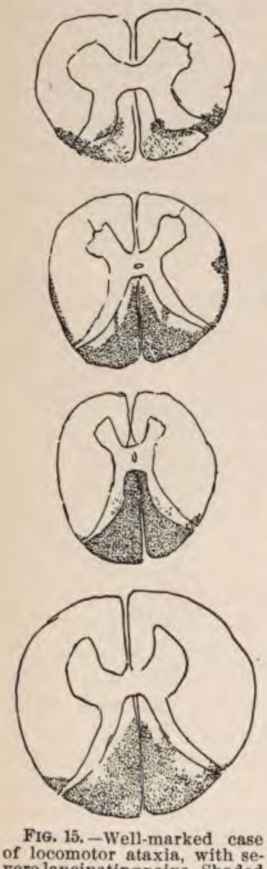

FIG. 15.—Well-marked case of locomotor ataxia, with severe lancinating pains. Shaded region shows diseased area (Davis).

Diagnosis.—Lancinating pains, ataxia, pupillary changes (described above), absent tendon-reflex, are sufficient to make the diagnosis.

Prognosis.—Unfavorable as to recovery; it is slowly progressive.

Treatment.—Mercury and potassium iodid should be given only in clearly syphilitic cases, as harm may result from their use. As internal remedies, perhaps Donovan's solution is as good as any. If the physical condition is poor, nutritious, easily digestible food with cod-liver oil. For the relief of symptoms, the lancinating pains are the most troublesome. Acetanilid in 10-grain doses when the pains begin will often give relief (phenacetin and antipyrin are not nearly so efficacious); it should not be repeated too frequently. There are cases in which this dose will fail to give relief,—in fact, any dose which is safe,—and nothing but a hypodermic of *morphin* will allay the excruciating pains. Suspension with

Sayre's apparatus (for putting on the plaster-jacket) and modifications have been used; in some cases it gives relief to many of the symptoms—among them the pain, ataxia, and bladder symptoms; in others it does not appear to be at all beneficial. In making application of the suspension apparatus, care should be taken to learn if there are contraindications to its use: heart disease, serious disease of the blood-vessels, and great weakness are the chief ones. The suspension should be very slow and cautious. On the least evidence of ill effect the person should be lowered. It should not be continued more than half a minute the first time, and gradually increased to two or three minutes if it is borne well; it can be practised every other day. Belladonna often gives relief to the dribbling and involuntary discharge of urine. Overwork of all kinds and sexual and alcoholic excesses should be carefully avoided. Only a moderate amount of walking should be done. Cold and damp should be avoided. A residence, temporarily at least, in a dry elevated climate, with freedom from work and worry, often gives improvement. Suspension has not proved as beneficial as was expected. The reëducation of the muscles by gymnastic exercises of a special character, as has been suggested by Fränkel, is of benefit in two ways: by exercise of the muscles and by giving confidence to the person. It is of advantage only to those patients in whom coördination is very much impaired.

Bibliography.—J. C. Shaw, "Degeneration of the Peripheral Nerves in Locomotor Ataxia," Journal Nervous and Mental Disease, 1888; Déjérine and Thomas, Maladies de la Moelle, 1909; Fränkel, Tabetic Exercises, Blakiston, 1902; Marie and Guillain, Revue Neurologique, Jan., 1903; Plant, The Serum Diagnosis of Syphilis.

CHAPTER III.

DISEASES OF THE ANTEROLATERAL COLUMNS.

In the purer forms of the syndrome consecutive to disease of the lateral columns contractures, paresis with exaggeration of the tendon-reflexes, clonus, the Babinski reflex, and tremor are the main symptoms.

The main disease types exhibiting these phenomena are the late contractures of hemiplegia—spastic spinal paralysis (lateral sclerosis) and Little's disease. The symptoms may also be found in part or entirely in disseminated sclerosis diffuse myelitis, or general paresis.

LATERAL SCLEROSIS (Spastic Spinal Paralysis; Spastic Paraplegia; Tabes Dorsalis Spasmodique; Primary Sclerosis of the Lateral Columns).

This condition was first described by Seguin in 1873, by Erb in 1875, and by Charcot in 1876.

Etiology.—There is an hereditary form of this disease affecting many members of a family. Little can be said about the etiology of the acquired form. Many cases diagnosed lateral sclerosis are undoubtedly secondary to some other lesion, such as tumor, multiple sclerosis, myelitis, etc.

Symptoms.—It begins as a weakness in the lower extremities; the legs tire easily, and if long walks are attempted, they tremble, give way, and feel heavy; the feet are not lifted from the ground as they are normally in walking, but shuffled along, and in the advanced condition they scrape along the floor; the knees are slightly bent; the legs present a rigid appearance; in motion they have lost the suppleness and flexibility at the joints observed in health; when the person sits down and arises again, it is found that the muscles are very stiff, and it is with some difficulty that he arises; it is soon observed that the legs tremble, especially if the muscles are put on the stretch, as in any awkward position which the legs may be placed in. There may be spasm in the legs, especially *at night; there may* be some aching in the spinal column. If the legs are examined, they are found to be more or less rigid and resisting, owing to muscular contraction; the muscular opwer is good—only a slight weakness. The reflexes are very much exaggerated, and the ankle-clonus is marked. This is elicited by holding the slightly flexed knee in the hand, and with the other hand on the sole of the foot forcibly flex the foot on the leg and hold it there with firm pressure. The Babinski reflex is the dorsal flexion of the great toe with plantar flexion of the other toes on scratching the sole of the foot with a sharp point. There are no sensory symptoms; no vesical or rectal disorders; no muscular atrophy; no trophic disorders. The disease progresses very slowly; it is often confined entirely to the lower extremities, but may involve the upper as well. Some cases of spastic paraplegia have been described in children, but these cases are possibly due to some cerebral disease of which descending degeneration is the result, and should be kept apart from the condition here described.

Pathologic Anatomy.—A primary sclerosis of the lateral columns if such a condition exists without lesion in other portions of the central nervous system. We have very little knowledge of primary lateral sclerosis; in combination with lesions in other portions of the spinal cord more is known. (See Combined Sclerosis, Friedreich's Disease, Lateral Amyotrophic Sclerosis, etc.)

Diagnosis.—Before making a diagnosis of primary lateral sclerosis one must absolutely exclude tumor, multiple sclerosis, and myelitis. The exaggerated reflexes; the muscular spasm; and the consequent spastic walk; the gradual onset of the symptoms and their slow progress; the absence of symptoms indicating a localized transverse lesion; the absence of sensory symptoms, of bladder and rectal disorders and trophic disturbances, and the appearance of the disease between thirty and fifty years of age.

Prognosis.—Unfavorable as to ultimate recovery; those suffering from it may live a great many years and it may be confined entirely to the legs.

Treatment.—Medication is useless unless the general health is impaired. Massage, cold sponging, electric treatment of a mild kind.

LITTLE'S DISEASE.

This is frequently described as a congenital form of the former affection, and is due to a defective development of the pyramidal tracts. Heredity plays some part in the etiology.

CHAPTER IV.

LESION OF THE POSTEROLATERAL COLUMN —THE COMBINED SCLEROSES.

COMBINED SCLEROSES.

UNDER the general designation of combined scleroses have been classed a number of conditions whose symptomatology and even pathologic anatomy are not fully made out.

Friedreich's disease and ataxic paraplegia are types as far as the pathologic anatomy is concerned.

ATAXIC PARAPLEGIA.

Etiology.—Heredity, syphilis, excessive physical labor, exposure; it occurs also in elderly persons who have been subject to much privation and anxiety. It has been known to accompany pernicious anemia, leukemia, septicemia, and lead-poisoning.

Symptoms.—It begins usually very slowly, by stiffness and trembling in the lower extremities, with soreness and aching. Early the sexual vigor is lost; there is gradually developed marked motor weakness; there may be a feeling of numbness in the legs; occasionally lightning-like pains are present, but they are not, as a rule, present.

Ataxia is always present, as shown by incoördinate movements in walking or standing with eyes shut, etc. The gait is a mixture of locomotor ataxia and spastic paralysis. There may be dribbling or slowness of urination. The reflexes are exaggerated. The symptoms are often confined to the lower extremities, but the upper may be affected. As complications there may be mental disease somewhat similar to that observed in locomotor ataxia.

Pathologic Anatomy.—The lesion is a sclerosis of the lateral and posterior columns, and the clinical picture will vary according to the grade of involvement of each system. If the lesion is mainly that of tabes, so will the symptoms be, and vice versâ (Fig. 16).

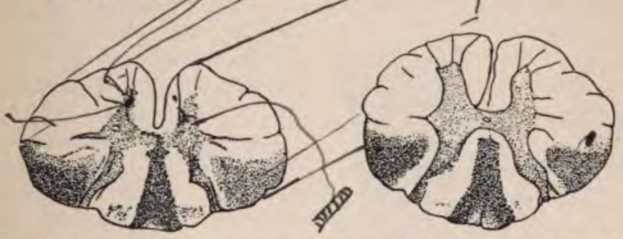

FIG. 16.—Ataxic paraplegia. Shaded regions indicate the disease in the white matter.

Diagnosis.—The slow progress of the disease, the association of ataxia, paresis, exaggerated reflexes.

Prognosis.—It is a slowly progressive disease; there is slight tendency for it to cause death.

Treatment must be the same as recommended in locomotor ataxia, Friedreich's disease, etc.

FRIEDREICH'S DISEASE (Hereditary Ataxia).

This disease was first described by Friedreich in 1861. It develops in children at an early age, as the result probably of hereditary influences, and it usually affects several children in the same family, but isolated cases are not infrequent. It occasionally develops as the individual grows up. There may be a neurotic family history; the sexes are about equally affected.

Symptoms.—It is first shown by an unsteadiness in walking; the child is awkward—falls easily and frequently; as the disease advances the upper extremities are affected; they become like the legs; the person's movements are disorderly. This increases; soon difficulty in speech is observed:

it is slow and hesitating, and can become quite unintelligible, owing to the disorderly movement of the muscles. Nystagmus is not infrequent. Headache and vertigo are common. The tendon-reflex is lost in most of the cases, but it may be present and even exaggerated in some cases. Spinal curvatures may be present. Less common symptoms may be spasms, tremors, decreased electric excitability, polyuria, glycosuria, and vasomotor disturbances, flushing, profuse sweating, etc. There may be pains, but they are not lightning-like, but dull, and may be severe, located in one spot for a long time; as a rule, sensibility is normal, but there may be slight anesthesia. Contractures may occur in the lower extremities (Fig. 17). There are no pupillary changes.

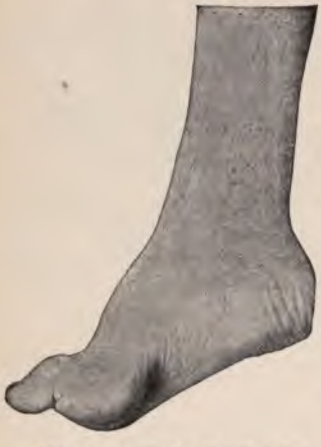

FIG. 17.—Clubbed foot of Friedreich's disease, showing shortened arch and retracted great toe (Church).

Diagnosis.—From locomotor ataxia: Friedreich's disease begins usually in very young children; only rarely the first symptoms appear at an age when locomotor ataxia is common. There is absence of pains, of marked sensory symptoms, of bladder disturbances, of diplopia, and "crises" of abdominal symptoms, constriction in hypogastric region, of arthropathies. The very slow evolution of Friedreich's disease.

From disseminated sclerosis, with which it is most likely to be confounded: There is no tendency in disseminated sclerosis to occur in several members of a family. The disordered movements are more jerky and slow and the disorder of speaking is different—more slow and drawling, hesitating than in Friedreich's disease. The gait in multiple sclerosis is spastic.

Pathologic Anatomy.—It has been found that the spinal cord is smaller than the normal in all these cases. There appears to be a defect in its development. The result is that sooner or later it undergoes a premature pathologic process, and this takes place in the posterior and lateral columns. The extent to which these columns have been found diseased varies somewhat, as the accompanying illustrations will indicate (Fig. 18).

Histologically, some authors have described posterior spinal meningitis, but in the majority of these cases it has not been found; the gray degeneration of the posterior columns has been constant, atrophy, and disappearance of the nerve-fibers, with some thickening of the neuroglia, flattening of the cord from before backward. Degeneration of Clarke's columns and of the cerebellar tract and atrophy of the posterior roots have been found.

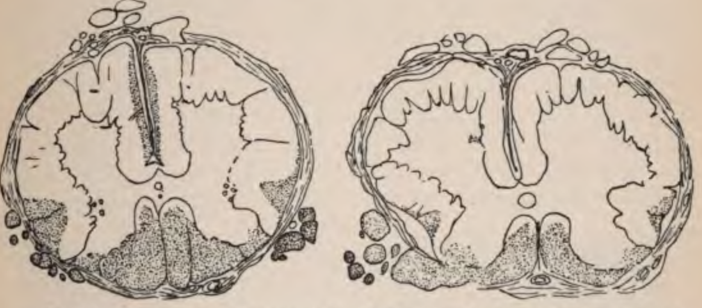

FIG. 18.—Showing the changes in the posterior and lateral columns (shaded regions) of the spinal cord (drawn from illustrations by Dr. W. E. Smith, *Boston Medical and Surgical Journal*, 1885).

Bibliography.—Déjérine and Thomas, Maladies de la Moelle, 1909. Oppenheim, Nervenkrankheiten, 1908.

CHAPTER V.

LESION OF THE ANTERIOR HORNS AND OF THE LATERAL TRACTS.

AMYOTROPHIC LATERAL SCLEROSIS (Spastic Muscular Atrophy: Charcot's Disease).

THIS was for a long time confounded with progressive muscular atrophy until Professor Charcot pointed out the distinctive features.

Etiology.—It occurs chiefly between thirty and fifty years of age; men are most frequently affected. Very little is known as to its causation. Heredity may play a part.

Symptoms.—It usually begins in the upper extremities, but almost simultaneously in the lower; the majority of the cases show early symptoms of medullary disease, as a difficulty in speaking. There is a certain amount of weakness in the members; even at this early stage the muscles are

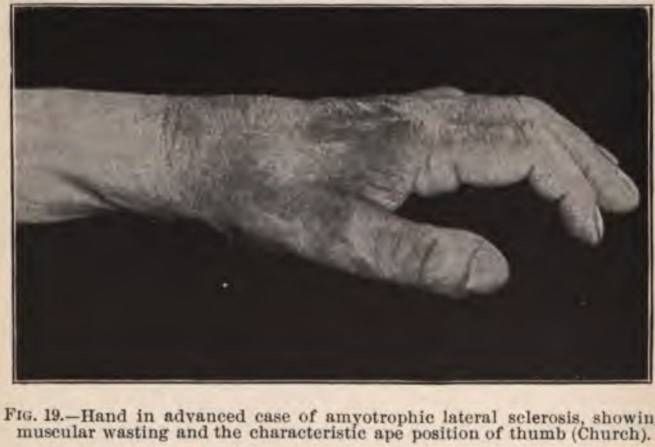

FIG. 19.—Hand in advanced case of amyotrophic lateral sclerosis, showing muscular wasting and the characteristic ape position of thumb (Church).

somewhat wasted; it is not in individual or groups of muscles, as in the common type of progressive muscular atrophy, but is a more or less general wasting—an atrophy *en masse*, as Professor Charcot says. This muscular wasting extends rapidly to the shoulders, neck, and chest, with paresis, out of all proportion to the muscular wasting. Soon the lower extremities show evidence of atrophy, but it is seldom so marked as in the upper extremities. The walk is spastic and stiff; the feet are not lifted from the ground, but dragged and shuffled along; the toes scrape the ground; the knees are stiff, and the muscles rigid. As the disease progresses the extremities become quite useless and stiff; contracture is more or less marked,—in some cases it is very slight, indeed,—and when the muscular atrophy is extreme, may disappear entirely. The reflexes everywhere are exaggerated. As the disease progresses the medulla becomes more involved, and all the symptoms of bulbar paralysis become marked; paresis of the muscles of the face and deglutition, atrophy of the tongue, difficulty in speaking and swallowing, and in the advanced stages there is great danger of food passing into the trachea. There are few sensory disorders or rectal or vesical disturbances in this disease, save in the later stages (Fig. 19).

Prognosis.—Unfavorable. Death takes place within two or three years after the onset of the disease from paralysis of the respiratory center or from exhaustion due to the inability to take sufficient food, and from difficulties of respiration consequent upon the atrophy of the respiratory muscles and the accumulation of mucus in the lungs.

Diagnosis.—The association of motor weakness with muscular atrophy and exaggerated reflexes; the early appearance of bulbar symptoms; the absence of sensory, bladder, and rectal disorders.

Pathology.—The lesion is almost always strictly confined to the anterior horns and the lateral columns. In the anterior horns the changes are similar to those found in progressive muscular atrophy—gradual wasting, pigmentation, and absorption of the large ganglion-cells; sclerosis in the lateral columns.

Bibliography.—Charcot, Diseases of the Nervous System. Sacki and Schmaus, Pathologische Anatomie des Rückenmarks, 1901.

CHAPTER VI.

LESIONS OF THE CENTRAL GRAY SUBSTANCE.

SYRINGOMYELIA.

For a long time it had been observed at autopsies that there were in some cases cavities in the spinal cord, but the fact was known only as a pathologic curiosity. Olivier, in 1827, first used the name syringomyelia; he did not believe in a central canal in the spinal cord, and looked upon these cavities as an arrest of development. Later it was clearly proved that there was a central canal in the spinal cord. Soon observations were recorded of an abnormal dilatation of the central canal, and they were looked upon as arrests of development and described under the name of hydromyelia. Hollopeau, later, studied conditions somewhat analogous, under the name *diffuse peri-ependymal sclerosis.* In 1869 Grimm showed that the old syringomyelia, hydromyelia, and peri-ependymal myelitis was really due to destructive lesions in the center of the cord. This view was adopted by Simon, Westphal, and Leyden, but later the work of Schultze (1882) and Kahler (1881) showed that this pathologic lesion was associated with a certain grouping of symptoms. A large number of observers have added to the subject since.

Little is known as to its causation. The disease affects men oftener than women.

Symptoms.—There is great diversity in the way in which the symptoms begin: weakness in the hands or arms or a sensation of numbness may be felt. Muscular atrophy is added to the weakness; it is of the type of progressive muscular atrophy (see that disease); it may begin in one hand or in both. There are loss of sensibility to pain and thermo-*anesthesia: the* person is unable to detect the difference between heat and cold on a more or less extensive area of the body; sometimes the person is not aware of this, and only an examination reveals it. Occasionally the patient finds that he has burns and injuries and does not know when he received them. This dissociation is very characteristic. Tactile sensibility and the muscular sense are often unimpaired, but they may both be diminished and even lost. Sometimes the patient complains of pains, tinglings about the extremities, joints, and back, with headache. The reflexes may be either abolished or exaggerated. Scoliosis is spoken of as almost a constant symptom, and it is seated, according to Blocq, in the dorsolumbar region with the convexity to the right. Trophic disorders are quite common. The muscular atrophy usually shows first in the hands and extends afterward to other parts; it may begin in the shoulder muscles or in the lower extremities. Westphal, Schultze, and Grasset have each observed a case with facial paralysis. There may be fibrillary twitchings in the muscles. Electric excitability is usually diminished. The skin is often affected with herpetic and eczematous eruptions, and an atrophy of the skin called "glossy skin" has been described. The nails are very apt to become cracked, furrowed, and thick; there may be an edematous condition of the cellular tissue. The parts may be cold and cyanosed from defective circulation; slight irritation may cause persistent redness; the fingers may be swollen and red. The joints are sometimes the seat of arthropathies. The bones are thickened and often become brittle (Déjérine).

The numbness, analgesia, disorder of temperature-sense, and pains are found in the areas of the body whose nerve-supply is from the spinal-cord segments involved in the disease. In the last few years numerous contributions to this subject have shown that the symptomatology may be very complex in its arrangement. The disease may present the general grouping of symptoms found in amyotrophic lateral sclerosis, plus the sensory and trophic disorders described above. In other cases there are tabetic symptoms. There is ataxia in the upper or lower extremities, or in both, in addition to the other characteristic symptoms of syringomyelia. This tabetic form must not be confounded with cases in which true tabes and syringomyelia are associated. There are also cases in which the medulla oblongata is involved, and there are what are known as bulbar symptoms; these are due to the implication of the cranial nerves and their nuclei in the floor of the fourth ventricle. There may be inequality of the pupils, paralysis of the sixth nerve, diplopia, nystagmus, Argyll-Robertson pupil, which is found so commonly in locomotor ataxia, hemiatrophy of the tongue, paresis, and atrophy of the vocal cord. One or more of these symptoms may be present with the disorders of sensation in the face. These bulbar symptoms are usually a late manifestation in the disease, but they have occasionally been observed at its onset. In such cases there have been apoplectiform seizures at the beginning. There is a special predilection for the cervical portion of the spinal cord in this disease; hence the fact that the upper extremities are generally the seat of the first symptoms. If the disease process extends upward into the medulla oblongata, then we have added the bulbar symptoms. The disease always extends downward into the dorsal region for some distance, but, as a rule, does not involve the lumbar portion of the cord. The arthropathies, which are not infrequent in this disease, are most commonly found in the *upper* extremities, whereas in locomotor ataxia, in which arthropathies also occur, they are most common in the lower

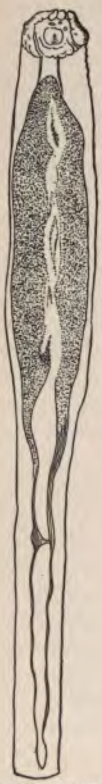

FIG. 20.—Showing the location and extent of the gliomatous tumor of the cord and cavity (after Ira Van Gieson).

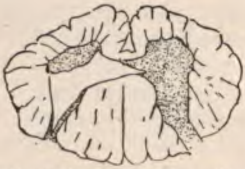

FIG. 21.—Cavity in the gray matter. Syringomyelia.

extremities. This disease may run a very slow course, lasting ten or twenty years from its first manifestations; or it may be rapid, the person dying in one or two years from implication of the medulla. Many cases have been reported in which the disease has appeared in quite young persons, and in whom there have been evidences of defects in development. These cases have been called congenital. It is believed, with much foundation, that there was an original defect in the cord, and that the changes in these cases are teratologic (Fig. 22).

Morvan's disease is a variety of syringomyelia which begins with neuralgic-like pains in the hands, followed by panaris on the fingers, analgesia, anesthesia, weakness, muscle atrophy, and trophic disorders.

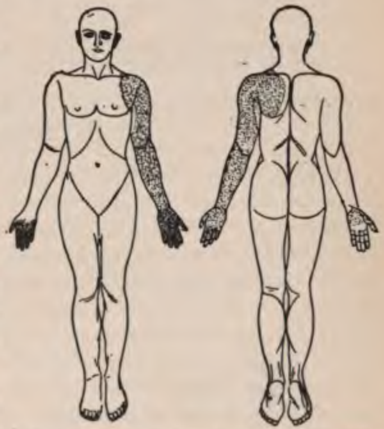

FIG. 22.—Areas of analgesia in syringomyelia (Jelliffe).

Diagnosis.—Thermo-anesthesia with preservation of tactile sensibility. Trophic disorders, such as panaris, arthropathies, and muscular atrophy, without increase of reflexes. There may be complete analgesia. The dissociation of sensations alone is not enough to found a diagnosis upon, as it may occur in other diseases.

Pathologic Anatomy.—Cavities more or less large, situated generally in the posterior portions of the cord, but often encroaching upon the other parts; they are usually of irregular shape and may extend throughout the entire cord; these cavities are the result of a pathologic change in the cord. This change is due either to a primary proliferation of the glia cells around the central canal—glioma—or the proliferation may be secondary to hydromyelia. The tumor develops in the posterior part of the cord and gradually increases; later, the central portion of the tumor breaks down and a cavity is formed; this may break into the central canal if it did not start originally there; below the tumor the central canal is dilated. The cavity is lined by a tissue somewhat loosely arranged, with numerous spider-cells and glia-cells (Figs. 20, 21).

Bibliography.—Schlesinger, Die Syringomyelie (monograph). Hinsdale, Syringomyelia (monograph). A full bibliography will be found in these two works.

CHAPTER VII.

DIFFUSE DISEASES OF THE CORD.

MYELITIS (Inflammation of the Spinal Cord, Acute, Subacute, and Chronic).

ACUTE, subacute, and chronic have reference only to the length of time the symptoms are in developing; it is a more or less active inflammatory process. It may involve only portions of the cord; to a certain extent functionally distinct tracts; systematized lesions, as in acute myelitis of the anterior horns; or it may be more or less diffuse, involving gray and white matter without regard to regions. It sometimes affects the cord throughout transversely, involving white and gray matter for a limited distance vertically—transverse myelitis; at other times it may affect large portions of the cord—diffuse myelitis. Inflammation of the cord occurs under a number of circumstances; in all cases of compression of the cord—compression myelitis—but, as it has some features of its own, it is treated separately. It occurs as a somewhat chronic process in disseminated sclerosis. It may be set up at any time in a spinal cord the seat of the degenerative diseases—locomotor ataxia, for instance.

Etiology.—It is said to be caused by cold, damp, and exposure, overexertion, falls, concussion, syphilis; after typhoid, variola, measles, and other diseases which impair the vitality of the system. It follows puerperal diseases and the puerperal state, poisoning by lead, arsenic, tuberculosis, or other *toxic agents* or infectious diseases.

Symptoms.—The symptoms vary according to the extent of the lesion. Weakness, which may begin in one leg and extend to the other, causing difficulty in walking, pain in the back, numbness in legs, tingling, pricking at times; the limbs may tremble, and there may be some passing cramps in the muscles. These symptoms progress until the person becomes helpless and is confined to bed; the legs become weaker until they cannot be moved. If the disease progresses, the bladder becomes involved. At first there may be retention of urine; later, it dribbles away, and the bowels may act involuntarily; the numbness increases to anesthesia, more or less great, according to the severity and extent of the inflammation; a band-like feeling is felt across the body: if at first low down, at or below the umbilicus. As the inflammation extends upward, the girdle sensation goes higher and higher, and it will be found that the anesthesia follows pretty closely after it. This band-like sensation indicates the line of the inflammation; all the parts of the body below are more or less anesthetic and paralyzed. Trophic disorders begin to appear; bullæ form on the feet and toes; cystitis is set up; the urine becomes ammoniacal and is loaded with mucus; the unfortunate person aches unless the anesthesia is great, which it only rarely is; bed-sores form, and in men the penis may slough. The facial expression is pale, anxious, and distressed. There may be some elevation of temperature. As the disease extends upward the respiration is involved, and death occurs by accumulation of mucus in the throat and lungs and involvement of the medulla. A case with these clinical features may run a course of six months or more before death occurs; others die in two or three months. The middle and lower dorsal region is the most frequent seat of this disease. The seat of the myelitis will somewhat modify the symptoms; its location can be fairly accurately determined by a study of the symptoms in each case: the motor disturbances; the sensory; the reflexes, etc., with the aid of the diagram of the spinal cord in its relation to the vertebral column, and the table of Starr.

Diagnosis.—The somewhat rapid onset of the symptoms as a motor weakness, associated with the decided sensory symptoms, anesthesia, if the disease progresses, the appearance of bed-sores, fever, often moderate, paralysis of bladder, etc.

Prognosis.—In the severe cases with rapidly progressing symptoms, unfavorable, as a rule; some cases of transverse myelitis recover. I have seen them recover when there were decided anesthesia and almost complete paralysis.

Treatment.—Salicylates often appear to be of service. Cupping is useful. If there is reason for thinking the disease is due to syphilis, mercury and iodid of potassium. The urine should be drawn off, and if there is a tendency to cystitis, the bladder should be washed out every day with a solution of boric acid.

The bed-sores can be treated according to Brown-Séquard's method of alternate applications of heat and cold—ice and hot poultices. One of the best applications, if not the best, for these bed-sores is a mixture of aristol in balsam of Peru and absorbent cotton over it. The person should be kept clean, and pressure on the paralyzed parts prevented as much as possible; a water- or air-bed may be found necessary.

Compression Myelitis.—This occurs from pressure on the spinal cord by fractures of the spine, caries of the spine, tumors of the spine, or tumors developed within the spinal canal.

The onset of the symptoms may be either sudden or gradual, according to the cause of compression. In fracture it is sudden, as a rule; in tumors and caries, gradual.

Symptoms.—There is a grouping of symptoms common to these cases of compression. Paralysis is more or less complete in all the parts below the seat of disease. There is irritation at the seat of disease, as shown by pains, constant or darting, along the course of the nerves in the immediate neighborhood of the compression. Cramps in the muscles supplied by these nerves occur, and there may be anesthesia in their course if the pressure is sufficiently great to injure them. If the pressure is very great, so as to compress the cord very much or cut it across, then anesthesia may be more or less complete in all the parts below; the functions of the bladder are disturbed; the urine must be drawn off—it dribbles away. There are pain and aching in the hips and legs. Trophic disorders soon appear. If the compression is decided and sudden, the symptoms develop rapidly. If the cause of compression is slowly operative, they come on later and progressively. They consist in the formation of bullæ and ulcerations on the paralyzed extremities and bed-sores with cystitis. If the disease is in the middorsal region, what has been called "spinal epilepsy" occurs. It is a spasmodic twitching of the lower extremities; muscular wasting may be present. The paralyzed parts look bluish. There may be a moderate elevation of temperature. The pulse-rate is increased, and is usually out of proportion to the elevation of temperature. There is frequent vomiting. The reflexes are abolished at the seat of compression. If the pressure is high up, there is increase of the reflexes in the parts below.

In fracture of the spine the symptoms appear suddenly; the most common seat of fracture is at the fifth and sixth cervical and the last dorsal and first lumbar vertebræ, but it may occur anywhere.

The fractured bones are driven in upon the spinal cord, compressing it or cutting it off entirely. Occasionally the compression does not occur at once, but later. Motion causes a displacement of a portion of the fractured bone to encroach upon the spinal canal.

In caries of the spine there are frequent symptoms of irritation of the nerves passing off from the seat of disease with, perhaps, some paresis and muscular wasting of the parts supplied by those nerves, and paralysis may come on slowly or suddenly. The paralysis in these cases comes on in two ways —either from breaking down of the carious bones and displacement of the fragments, or by the accumulation of pus at the seat of caries, which gradually presses the dura in upon the cord. There are cases in which the paralysis will come on suddenly in an old case of caries, and a good deal of improvement may occur in the paralysis afterward. A careful and frequent examination of the spine in the early stages will reveal the presence of the diseased bone.

Pathologic Anatomy.—The changes which take place in the cord vary. In the immediate vicinity of the compression, and at an early date, the cord is swollen, the axis-cylinders are swollen, the myelin is broken up, there are great vascularity and distention of the blood-vessels, and there may be some spider-cells; granular corpuscles are always found in the fresh state; later more or less wasting of the spinal cord occurs. Above and below the seat of injury secondary degenerations occur.

TUMORS OF THE CORD.

Tumors are frequently the cause of compression of the cord. These are either in the cord itself—intramedullary—or in its surroundings—extramedullary. The intramedullary tumors are usually gliomata or gummata. The extramedullary ones are fibromata, sarcomata, tubercles, and gummata in the dura; neuromata and neuro-fibromata in the nerve-roots, often multiple; and osteomata and osteosarcomata in the vertebral column.

Symptoms.—Usually the first symptoms observed are neuralgic pains in the region supplied by the cord segments affected. These begin as very slight fleeting pains and gradually increase in severity and become continuous. While this is an important diagnostic point, yet there are cord tumors which never occasion any pain. Cauda equina tumors have very severe pains. As the tumor grows, the ordinary symptoms of compression myelitis develop gradually. In many cases there is a point of tenderness over the spine of the vertebra at the level of the tumor.

Diagnosis.—Gradual onset with increasing pain; gradual onset and progressive course of compression signs; point of tenderness in vertebra at the level of the tumor.

Treatment.—This depends upon the nature of the compression; they are surgical cases, if the compression is due to caries or fracture. In cases of tumor the question of surgical interference must be considered. (For its indications consult Thorburn, *Surgery of the Spinal Cord*, Schlesinger on *Tumors of Spinal Cord.*)

CHAPTER VIII.

LOCALIZATION OF LESIONS IN THE SPINAL CORD.

Only a few words can be said here on this subject. The student must refer to the works on physiology, and with the aid of the accompanying table from Starr and the diagram of *the spinal* segments and their nerves, in relation to the vertebræ, *he will* have ample material for study and locating *lesions in the cord.* This study is of importance, as in injuries of the cord by fracture, tumor, etc., the possibility of surgical interference as a means of relief must be considered, and it is necessary to locate the lesion (Fig. 23).

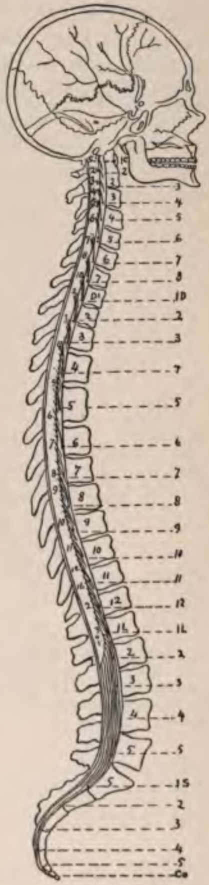

FIG. 23.—Spinal cord (after Gowers).

Lesions of the cauda equina give rise to paralysis, anesthesia, atrophy of muscles, and reaction of degeneration in the distribution of the sciatic nerve; the sphincter ani is paralyzed, while the bladder may remain normal. Lesions of the lower lumbar enlargement give rise to the same symptoms.

Lesions of the upper and midlumbar cord cause paraplegia without paralysis of the abdominal muscles. The paralyzed muscles retain their normal electric reactions, and the reflexes are increased. The sphincter is usually paralyzed. Lesions of the dorsal cord cause paralysis and anesthesia of all parts below the lesion. The line of anesthesia indicates the seat of lesion; the sphincters are paralyzed and reflexes exaggerated.

Lesions at last cervical and first dorsal; paralysis in the ulnar distribution and anesthesia of the lower forearm, ulnar side of hand and fingers; paralysis of flexor carpi ulnaris, etc.; paralysis of intercostal muscles; the line of body anesthesia just below clavicle.

A reference to the table and diagram will make this plain. Paralysis may be caused by a lesion in the anterior horn of the spinal cord; the muscles atrophy, and their electric reactions are changed, and the reflexes are lost for those muscles innervated by that diseased spinal segment. If the paralysis is due to an interference with the transmission of voluntary motor impulses through the pyramidal tract, as in paralysis from brain disease, the muscles do not atrophy; the reflexes are exaggerated, the tonicity of the muscles is increased, and there may be rigidity; the normal electric reactions are preserved. Loss of reflex indicates a lesion which interferes somewhere with the reflex arc for that spinal segment. Normal reflex indicates that the arc is intact; exaggerated reflex, that the inhibitory action of the brain is removed, and always indicates a cutting off (or irritation) of the pyramidal tract from the brain somewhere in its course; the reflex is exaggerated below the focus of disease (Fig. 24).

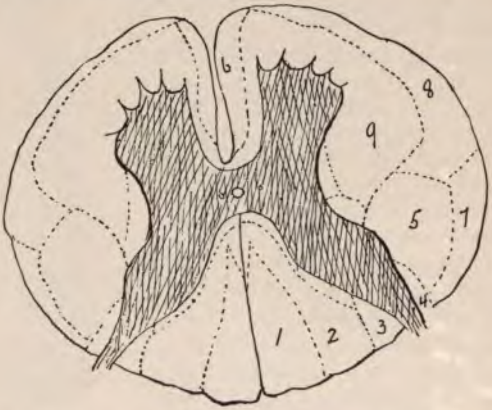

FIG. 24.—1, Column of Goll; 2, column of Burdach; 3, internal marginal zone of Lissauer; 4, external marginal zone of Lissauer; 5, crossed pyramidal tract; 6, direct pyramidal tract; 7, direct cerebellar tract; 8, Gowers' bundle; 9, deep portion of lateral column (Gowers' bundle contains the cerebrospinal, the ventral cerebellar, the spinothalamic, and the ventral pyramidal tracts) (Marburg).

For further information on this subject the student can refer to Thornburn, The Surgery of the Spinal Cord; Starr, chapters on Localization of Spinal-cord Diseases, Familiar Forms of Nervous Disease, Text-book on Organic Nervous *Diseases, 1910;* Head, Brain, 1900, 1902.

Localization of the Functions of the Segments of the Spinal Cord.—(*Starr.*)

Segment.	Muscles.	Reflex.	Sensation.
Second and third cervical	Sternomastoid, trapezius, scaleni and neck, diaphragm.	Hypochondrium (?); sudden inspiration produced by sudden pressure beneath the lower border of ribs.	Back of head to vertex; neck.
Fourth cervical	Diaphragm, deltoid, biceps, coracobrachialis, supinator longus, rhomboid, supra- and infraspinatus.	Pupil, fourth to seventh cervical; dilatation of the pupil produced by irritation of the neck.	Neck, upper shoulder, outer arm.
Fifth cervical	Deltoid, biceps, coracobrachialis, brachialis anticus, supinator longus, supinator brevis, rhomboid, teres minor, pectoralis, serratus magnus.	Scapular, fifth cervical to first dorsal; irritation of the skin over scapula produces contraction of the scapular muscles, supinator longus; tapping its tendon in wrist produces flexion of forearm.	Back of shoulder and arm; outer side of arm and forearm, front and back.
Sixth cervical	Biceps, brachialis anticus, pectoralis (clavicular part), serratus magnus, triceps, extensors of wrist and fingers, pronators.	Triceps, fifth to sixth cervical; tapping elbow tendon produces extension of forearm; posterior wrist, sixth to eighth cervical; tapping tendon causes extension of hand.	Outer side of forearm, front and back; outer half of hand.
Seventh cervical	Triceps (long head), extensors of wrist and fingers, pronators of wrist, flexors of wrist, subscapular, pectoralis (costal part), latissimus dorsi, teres major.	Anterior wrist, seventh to eighth cervical; tapping anterior tendons causes flexion of wrist; palmar, seventh cervical to first dorsal; striking palm causes closure of fingers.	Inner side of back of arm and forearm; radial half of hand.
Eighth cervical	Flexors of wrist and fingers, intrinsic muscles of hand.		Forearm and hand, inner half.
First dorsal	Extensors of thumb, intrinsic hand muscles, thenar and hypothenar eminences.		Forearm, inner half; ulnar distribution to hand.
Second to twelfth dorsal	Muscles of back and abdomen, erectores spinæ.	Epigastric, fourth to seventh dorsal; tickling mammary region causes retraction of the epigastrium; abdominal, seventh to eleventh dorsal; striking side of abdomen causes retraction of belly.	Skin of chest and abdomen in bands running around and downward corresponding to spinal nerves; upper gluteal region.

Localization of the Functions of the Segments of the Spinal Cord.—(*Starr.*) (*Continued.*)

Segment.	Muscles.	Reflex.	Sensation.
First lumbar	Iliopsoas, sartorius muscles of abdomen.	Cremasteric, first to third lumbar; striking inner thigh causes retraction of scrotum.	Skin over groin and front of scrotum.
Second lumbar	Iliopsoas, sartorius, flexors of knee (Remak), quadriceps femoris.	Patella tendon; striking tendon causes extension of leg.	Outer side of thigh.
Third lumbar	Quadriceps femoris, inner rotators of thigh, abductors of thigh.		Front and inner side of thigh.
Fourth lumbar	Abductors of thigh, adductors of thigh, flexors of knee (Ferrier), tibialis anticus.	Gluteal, fourth and fifth lumbar; striking buttock causes dimpling in fold of buttock.	Inner side of thigh and leg to ankle; inner side of foot.
Fifth lumbar	Outward rotators of thigh, flexors of knee (Ferrier), flexors of ankle, extensors of toes.		Back of thigh, back of leg, and outer part of foot.
First and second sacral	Flexors of ankle, long flexors of toes, peronei, intrinsic muscles of foot.	Plantar; tickling sole of foot causes flexion of toes and retraction of leg.	Back of thigh, leg, and foot, outer side.
Third to fifth sacral	Perineal muscles.	Foot reflex, Achilles tendon; overextension of foot causes rapid flexion, ankle-clonus, bladder and rectal centers.	Skin over scrotum, anus, perineum, genitals.

CHAPTER IX.

MULTIPLE SCLEROSES (Disseminated Sclerosis—Multiple Diffuse Sclerosis).

This syndrome manifests itself as a result of a number of causes. It cannot be regarded as a single disease entity. Scanning speech, exaggerated knee-jerks, ankle-clonus, nystagmus, and intention tremor are the main symptoms. To these are added a variety of localizing symptoms that indicate in part the location of many of the lesions.

Etiology.—It is observed in youth and middle age. It is said to follow blows or intense emotional excitement; it develops after the eruptive fevers, measles, typhoid, etc. Malaria, tuberculosis, or syphilis in turn may bring about the syndrome.

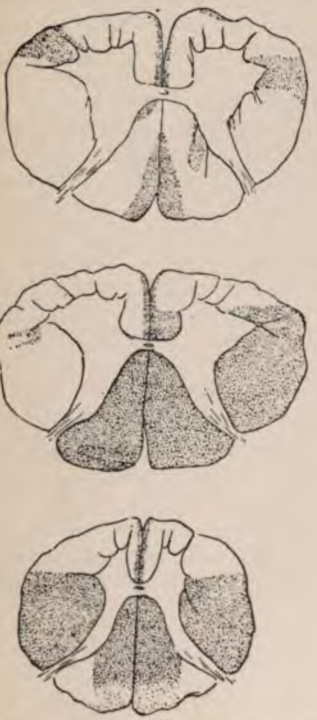

Fig. 25.—The shaded areas show the scattered distribution of the sclerosis at various levels of the spinal cord in a case of disseminated cerebrospinal sclerosis.

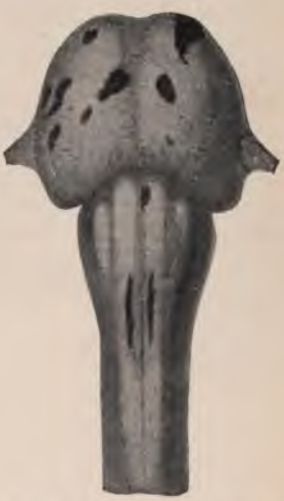

Fig. 26.—Lesions of the insular sclerosis in the pons and medulla (Charcot).

Symptoms.—The affection usually develops slowly as paresis in the lower extremities or in some eye muscle; slow and difficult gait with ataxia and paresthesia. There may be some disturbances in sensation in places about the extremities or body; vertigo; headache; tremor on voluntary efforts is common; speech is early affected—it is drawling, slow, and indistinct "scanning speech." Vision may be impaired; nystagmus is almost constant in this disease; apoplectiform or epileptiform seizures are rare, and there are contractures and rigidity in the limbs; the reflexes are exaggerated; tremor is almost constant, particularly on voluntary motion; it is often so violent when attempting to take any object that it is almost impossible to do so. Its true character is brought out by having the person attempt to raise a glass of water to the mouth.

Trophic disorders, bladder and rectal disturbances are rarely found in this disease. In the spinal form the gait is decidedly spastic so long as the person can walk. When he cannot, the legs are stiff and extended, as in spastic paraplegia. Spinal puncture shows no increase of cells in the cerebrospinal fluid.

Pathologic Anatomy.—Sclerotic patches scattered at various points without any order throughout the cerebrospinal axis. Increased activity in the neuroglia and its cells, which soon becomes so great that the nerve tissue is injured; the nerve-fibers gradually disappear, leaving the increased neuroglia tissue with its very much enlarged cells; the field of a section at this stage is best seen by reference to an illustration, showing the almost entire absence of nerve-fibers; a few axis-cylinders are observed and a large number of "spider cells"—cells with long processes (Figs. 25, 26).

Treatment.—Tonics and alteratives are of service, but only as palliatives, as the disease is steadily progressive. Antisyphilitic treatment may in rare instances be of service in non-typical cases.

SECTION III.

DISEASES OF THE MENINGES—SPINAL AND CEREBRAL.

MENINGITIS.

ACUTE SPINAL MENINGITIS (Leptomeningitis).

ACUTE meningitis confined to the spinal meninges is a very uncommon condition.

Etiology.—It occurs after rheumatism and pneumonia. It may occur as a complication in localized disease of the spinal column, such as caries or tumors. It may also be caused by infection.

Symptoms.—There are a feeling of heaviness, lack of desire to move about, but restlessness; pains in the back soon follow, with some elevation of temperature, irregular in type; pains radiating along the nerve-trunks, which may be severe or slight; cramps in the muscles of the extremities, so that the legs may be drawn up or kept in some unnatural position; the reflexes are increased; there is hyperesthesia of the skin; retention of urine may be present; the bowels are constipated. If the disease increases, there will be opisthotonos; disturbances of respiration and the muscular spasm give place to paralysis in some muscular groups; in place of the hyperesthesia we find anesthesia more or less marked.

The medulla may become involved; paralysis of muscles of the eye, disturbances of respiration, and coma, followed by death. There are often periods of remission.

Pathologic Anatomy.—The early stage of hyperemia is followed by serous, fibrinous, and later purulent exudation, which fills the arachnoid spaces and turns the cerebrospinal fluid turbid. Adhesions form between adjacent surfaces of the pia, and all the membranes become thickened. The cerebrospinal fluid shows increase of globulin and a large number of polynuclear leukocytes.

Meningitis Purulenta (Leptomeningitis with Pus).—This is also at times called meningitis of the convexity, but is frequently generalized, and even begins as a basilar meningitis.

Etiology.—It occurs at all ages—in infants, in young persons, and in adults. Men are most liable to it. It occurs secondary to purulent inflammation of the middle ear with bone disease; from injuries to the bones of the skull; after erysipelas, pneumonia, etc.; from disease of the parts about the nose, eyes, and head. It may follow immediately, or may occur with dysentery, typhus, typhoid, scarlet fever, variola, measles, and la grippe. Bacteriology has shown that in a large proportion of cases a bacterium is found. The most common is the pneumococcus; there have also been found streptococci, staphylococci, meningococci, the tubercle, coli, and typhoid bacilli. There may be more than one variety of bacteria found in an individual case. These bacteria may find their way through the lymphatics from distant foci. Epidemic cerebrospinal meningitis is a primary infectious disease.

Symptoms.—It is generally sudden in its onset: a chill, fever irregular in type, severe headache, and delirium. Vomiting may occur; the pain may be referred to any part of the head; light and noise are distressing; there may be disturbances of speech; aphasia; the headache may be intense, and in children give rise to screams; strabismus, sluggish or fixed pupils; muscular twitchings may occur; there may be paralysis if large accumulations of pus occur in the motor areas so as to cause pressure; in children there may be grinding of the teeth and trismus. The mode of death is similar to that in other varieties of meningitis.

Pathologic Anatomy.—In purulent leptomeningitis the meshes of the pia are filled with pus, especially along the vessels; the process may be most intense at the convexity or base if it is the result of middle-ear disease; the pus from the ear often finds its way along the fifth or the auditory nerve, and consequently the base of the brain is first and most extensively affected.

Prognosis is unfavorable in all these cases.

Treatment.—At present treatment gives no favorable results. Morphin to relieve the pain is indicated, or, better, codein. Surgery sometimes offers some opportunities.

Tuberculous Meningitis.—Etiology.—It occurs among the rich as well as the poor; it is most frequent between the ages of two and ten years; males are more frequently affected. The bacillus is the exciting cause.

Symptoms.—As premonitory symptoms, general indisposition, slight headache, loss of appetite and flesh, constipation, etc.; this may exist for weeks before pronounced symptoms appear. The symptoms vary much in different cases: there may be a chill; severe headache; photophobia; a rise of temperature; vomiting may occur; indisposition to move; there may be spasmodic twitchings in the muscles of the face or extremities; there soon occur lancinating pains in the head, during which the child screams, shrieks out, or moans and tosses about. The pupils may show no change at first, but soon there are inequalities and sluggishness in the light reactions, with spontaneous oscillations; later, they are fixed; there is now passing paresis of some eye muscles, so that there is, at times, strabismus; later it is constant. Retraction of the head and rigidity of the muscles of the neck soon develop; the face is dusky, and there is stupor, from which the child is with difficulty aroused. The abdomen may or may not be retracted; light and noise become more and more intolerable; the temperature may run high. There may be delirium, but it is not common. Optic neuritis may be found. As the disease progresses convulsions may occur; and later, coma and difficult respiration with frequent irregular and weak pulse close the scene.

Prognosis.—Unfavorable.

Pathologic Anatomy.—The pia is studded more or less thickly with tuberculous nodules, especially over the base; they surround the blood-vessels of the pia and even those entering the brain; there is some slight edema with fibropurulent deposit. The internal hydrocephalus which is present explains, in part, some of the symptoms. The cerebrospinal fluid shows enormous increase in the number of lymphocytes, increase of the globulin content, and usually absence of Fehling's reducing substances.

Chronic Syphilitic Meningitis (Gummatous Meningitis, Syphilitic Meningo-myelitis, Cerebrospinal Syphilis).—This affection begins as an inflammation of the pia mater, and later involves the brain and spinal cord by advancement along the vessel sheaths. It is a true tertiary syphilitic manifestation, in contradistinction to the para- or meta-syphilitic diseases—tabes dorsalis and general paresis.

Pathologic Anatomy.—The process begins with thickening of the pia and marked infiltration of lymphocytes around the vessels and in the meshes of the pia. Then granulation tissue forms and the pia looks cloudy and thickens. Later the other membranes are affected and adhesions form. As the disease progresses the vessels in the outer layer of the cord thicken and become surrounded by lymphocytes. Then the granulation tissue begins to grow, from the pia, in wedge-shaped masses, into the substance of the cord, destroying the fibers of the tracts. Gummata may form at various points and give localizing pressure signs.

Symptoms.—These depend on the part of the nervous system affected and the extent of the lesion. The clinical picture may be like that of tabes dorsalis, primary lateral sclerosis, multiple sclerosis, even syringomyelia and amyotrophic lateral sclerosis, or it may consist of any combination of the foregoing. The pupils almost invariably fail to respond to light. As the posterior nerve-roots are frequently involved in the infiltration, pains of severe character, either constant or lancinating, are common. The cerebrospinal fluid invariably shows a marked increase of lymphocytes, up to as high as 400 cells per c.mm., and in acute cases, where no treatment has been given, a few polynuclear leukocytes are to be seen. The globulin content is usually increased, and in active cases, where the lymphocyte count is high and globulin is present in great excess, the Fehling's reduction substances are usually absent. The blood-serum generally gives a positive Wassermann reaction and the cerebrospinal fluid a negative one.

Diagnosis.—History of infection not very long before the onset of the symptoms; polymorphism of the symptoms; the great lymphocyte increase, together with the increased globulin content in the cerebrospinal fluid, usually are sufficient to make the diagnosis.

Prognosis.—There is no disease of the central nervous system which is more amenable to treatment than this.

Treatment.—Active mercurialization and the use of iodids. Ehrlich's salvarsan ("606") may be tried.

SECTION IV.

DISEASES OF THE BRAIN—THE CEREBRAL VESSELS AND OTHER NON-NERVOUS ELEMENTS.

CHAPTER I.

THE LOCALIZATION OF BRAIN DISEASES.

WE will speak of the general symptoms of brain diseases, including headache, dizziness, vertigo, vomiting, etc. These symptoms may occur in the course of any brain disease, and indicate an irritation of the brain or arrest of its functions as a whole, and have, therefore, no direct value in localizing the lesion. The local symptoms of brain disease, on the other hand, are produced by affections of different parts of the brain, and each symptom shows that a particular part is disordered.

These symptoms are *spasm* or *paralysis* of one or two limbs or of one-half of the body; loss of perception of touch, temperature, pain, or position of one or two limbs or of one-half of the body; loss of visual power or of the power of smell, taste, hearing, and aphasia or disturbance of speech.

It will be observed that these symptoms may be entirely wanting in some cases of disease when that does not involve the portions of the brain concerned in sensation or motion. One of them may occur alone if the lesion is of small extent, or they may occur in certain combinations.

Convulsive movements limited to a portion of the body and when extending to other parts, following a definite order of progress, such as leg, arm, face, etc., are symptoms of irritation in the cortical motor area of the brain (Fig. 27). Such irritation originates in the cortical cells as spasms, and rarely occurs from subcortical lesion. (The experiments of Ferrier on the brain of the monkey are of great interest in the study of these conditions.) Each hemisphere, it will be remembered, controls the movements of the opposite side of the body.

Limited convulsive movements are termed cortical spasms, or Jacksonian epilepsy. It is important to notice the order of extension of the spasm, as this gives a clue to the point on the cortex where the irritation begins. These localized spasms do not induce a loss of consciousness.

Paralysis is a symptom of local disease in the motor area of the brain or in the *tract* from it to the spinal cord.

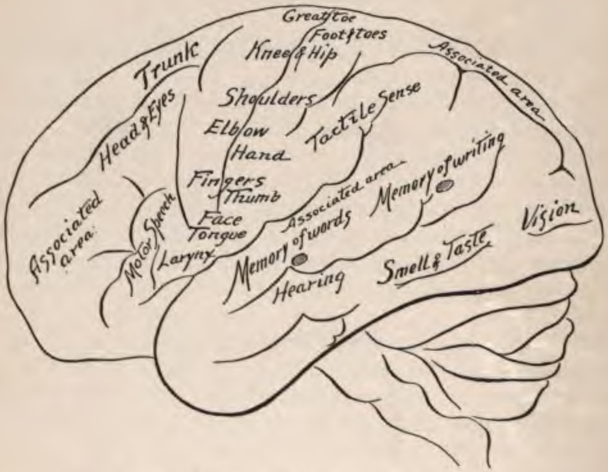

FIG. 27.—Localization in the cerebral cortex.

When only one member is affected, the disorder is called monoplegia; paralysis of one side is termed hemiplegia; when both hemispheres are affected, the disorder is called diplegia, and when both legs are affected, it is usual to speak of the disorder as paraplegia.

Paralysis may also be due to an interruption in the tract that conveys the impulses to the motor centers in the base of the brain and cord (subcortical paralysis). The vast majority of cases of hemiplegia are due to a lesion of the internal capsule (Fig. 28).

Hemiplegia associated with submotor palsy, with or without hemianopsia, is characteristic of a lesion in the crus (Fig. 29). The eye affected is, of course, the one on the side of the lesion, and opposite to the paralysis of the face, arm, and leg.

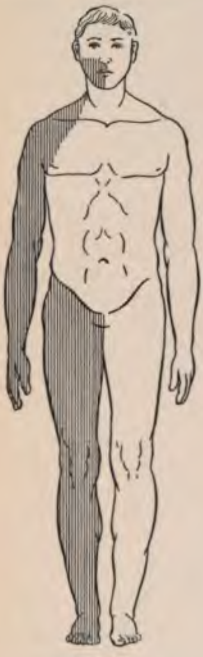
FIG. 28.

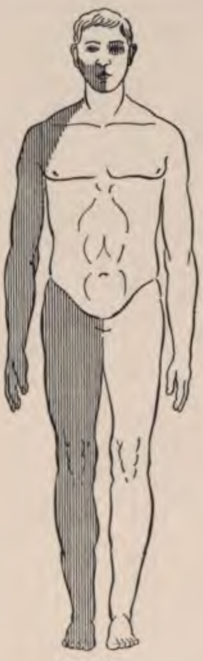
FIG. 29.

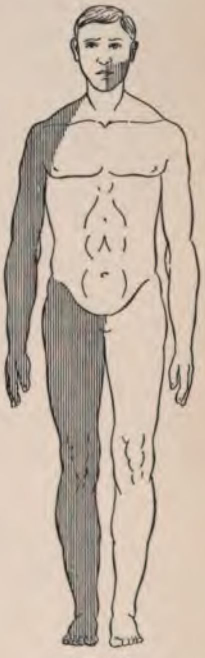
FIG. 30.

FIG. 28.—Common type of hemiplegia occurring from hemorrhage in the internal capsule. The shaded parts indicate the distribution of the paralysis.

FIG. 30.—The type of hemiplegia which occurs in lesions of the crus cerebri. The shaded portions indicate the paralyzed parts.

FIG. 30.—The type of hemiplegia occurring in lesions low down in pons varolii. The shaded parts indicate the distribution of the paralysis.

Hemiplegia may be due to lesion in the upper part of the pons, but when the lower part of the pons is affected, the face escapes on the side on which the limbs are paralyzed, but the opposite side of the face is paralyzed—the alternating or crossed paralysis (Figs. 30, 31).

Disturbances of touch are probably due to lesion in the posterior central convolution and the parts immediately adjoining. Lesion of this area causes a diminution of tactile sense on the opposite side of the body, usually, however, of a transitory nature. Lesions of the optic thalamus frequently give sensory diminution or loss, which is more or less permanent on the same side of the body as the lesion is on. The loss of power of recognition by touch is called astereognosis.

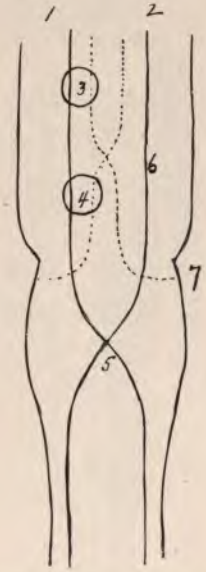

FIG. 31.—To show decussation of facial nerve in pons varolii: 1, 2, Right and left half of pons; 3, 4, lesions at upper and lower half of pons on one side; 5, decussation at pyramids in medulla; 6, fibers in pons which decussate in the medulla; 7, facial nerve-fibers, which are shown crossing in the middle of pons (after Nothnagel).

Disturbances of vision are a local symptom of cortical disease of the occipital lobe of the brain and of the visual *tracts from the* eyes to it. Lesion anywhere in the occipital lobe causes hemianopsia or blindness in the corresponding halves of the retina of each eye (Fig. 32). If the lesion is in the cuneus, there is homonymous hemianopsia (Fig. 33); if in the neighborhood of the thalamus, so as to interfere with the sensory tract in the internal capsule, there may be hemianesthesia; if in the neighborhood of the crus, so as to interfere

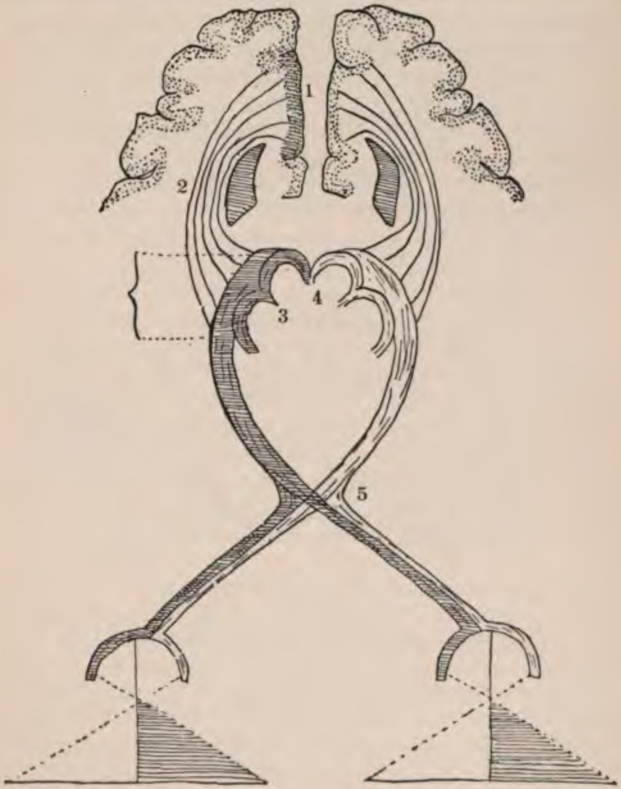

Fig. 32.—To show left lateral hemianopsia; lesion in right cuneus: 1, Cuneus; 2, optic tract in internal capsule; 3, corpus geniculatum laterale; 4, corpora quadrigemina, optic lobes; 5, optic chiasm (after Seguin).

with the motor tract, there may be hemiplegia and paralysis of the third nerve on the opposite side.

Disturbances of Hearing.—Brain diseases rarely cause total deafness, as each ear is connected with both temporal lobes. The center for hearing is in the middle part of the first temporal convolution. In the congenital deaf-mute this part is found atrophied. Complete deafness occurring in brain diseases usually is due to some lesion involving the fibers of the auditory nerve itself or its immediate connections with the cortex.

Disturbances of Smell.—When determining disturbances with this sense, the student must be careful to select non-irritant volatile substances, as ammonia, ether, etc., cause irritation of the sensory filaments of the fifth nerve and are, therefore, not true guides to disturbances of smell. The exact location of the sense of smell is uncertain, but the apex of the temporal lobes appears to be the probable site.

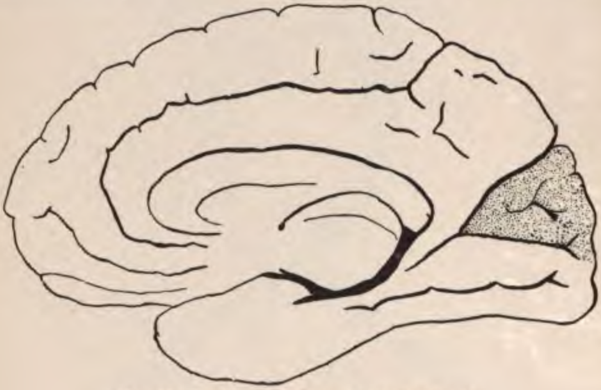

FIG. 33.—Lesion of cuneus in hemianopsia.

Disturbances of Taste.—This center also is not positively known, but we know that memories for taste are stored in the cortex of the uncinate convolution. (Reference to Fig. 27 will define these centers.)

Disturbances in the control of the **emotions** are sometimes *produced by lesion* in the frontal area of the cerebrum. The same symptoms are noticed in lesion of the anterior portion of the corpus callosum which unites the two frontal lobes. It has also been noticed that lesions in the thalamus interfere with the automatic expression of emotion.

Lesion of the basal ganglia, namely, the corpora striata, composed of the lenticular and caudate nuclei and the optic thalami are very common. It would seem evident that we cannot locate a lesion in the ganglia from any direct symptom. Even small lesions of the lenticular nucleus at times cause weakness of the opposite side of the body. Hemichorea and hemiathetosis are occasionally seen after lesion of the thalamus. Lesions of the pulvinar cause hemianopsia. It is also known that all the sensory tracts end in the thalamus, which is connected by its radiation with all parts of the cortex. The "thalamic syndrome," caused by lesions of the optic thalamus, consists of (1) Superficial persistent hemianesthesia; (2) A mild hemiplegia; (2) Hemiataxia and astereognosis; (4) Severe pains on the hemiplegic side; (5) Choreo-athetoid movements on the paralyzed, anesthetic side.

Lesions of the corpora quadrigemina are rare. When the anterior lobes are involved, oculomotor palsy, loss of pupil reflex, strabismus, and nystagmus may be produced. If the posterior pair are involved, disturbances of coördination and of hearing may be caused. Both pairs are usually affected together.

Lesion of the tegmentum of the crura cerebi, which lies beneath the corpora quadrigemina, will cause anesthesia as the sensory tracts pass through this region. Lesion of the foot of the crus cerebri in which the motor tract passes causes hemiplegia of the opposite side. As the third nerve passes through the foot of the crus a lesion here causes a paralysis of this nerve on the side of the lesion. For instance, a hemiplegia of one side with third-nerve paralysis of the other side indicates a lesion of the foot of the crus on the side of the third-nerve paralysis.

Lesion of the Pons and Medulla.—It is convenient to study these together, as practically they are continuous. The exact level of the lesion will be indicated by the nerves affected; oculomotor palsy being caused by lesion in the *crus cerebri;* fifth-, sixth-, seventh-, and eighth-nerve paralysis being caused by lesion in the pons, and ninth-, tenth-, eleventh-, and twelfth-nerve paralysis being caused by lesion in the medulla (Fig. 34). The gross lesions, like hemorrhage and their effects, have already been considered. The knowledge of location of the various nuclei of the cranial nerve will indicate at once the site of the lesion. The pons also contains the middle peduncle of the cerebellum, so that lesions in *the pons are likely to* cause symptoms of the cerebellar type.

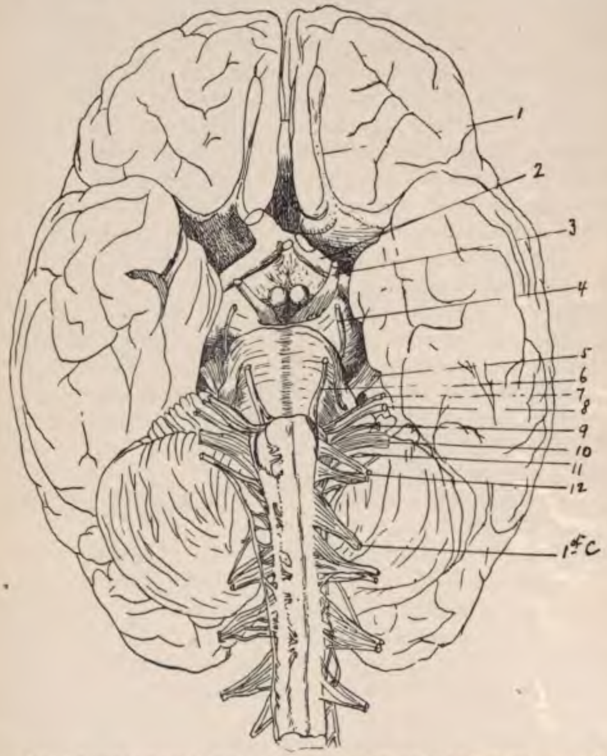

FIG. 34.—Showing base of brain. The numbers on the plate correspond to the respective cranial nerves.

Lesions of the Brain Base.—Disorders of smell would be a guide to lesions in the anterior fossa. Paralysis is not caused by lesions in the part of the brain resting in this portion of the skull unless they grow backward, so as to compress the cranial nerves situated further back (Fig. 35).

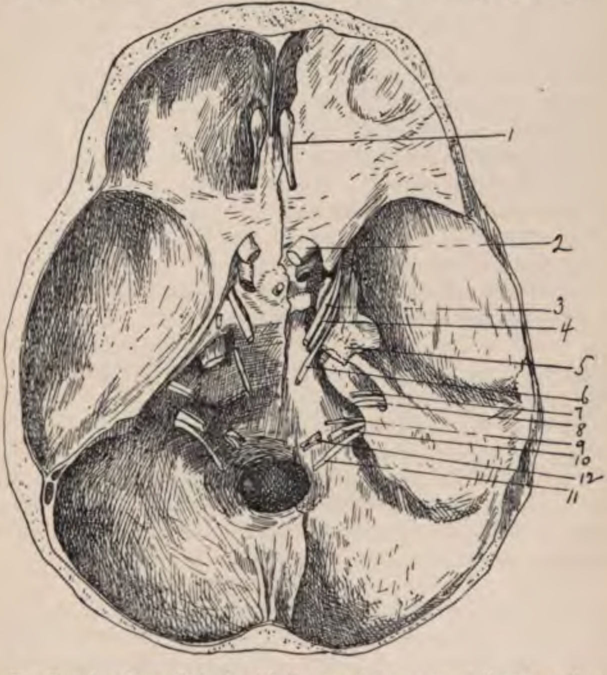

FIG. 35.—Showing base of skull with the cranial nerves as they pass through their foramen of exit; the numbering corresponds to the nerves.

Lesions of the hypophysis (pituitary body) are not uncommon. Almost invariably there is found the peculiar enlargement of the body previously described under Acromegaly. In most autopsies on acromegaly a lesion of the hypophysis, usually a tumor, has been found. The converse is not true, as lesions of the pituitary body have been found in which the skeleton was normal. Excessive somnolence is also a feature in lesion of the hypophysis. In a case under my observation the patient would fall asleep at her meals—frequently while raising a cup of coffee to her mouth.

It is conceivable that a large growth in the neighborhood of the hypophysis may cause compression of the optic tracts and olfactory lobes, and when the tumor is very large, the pons and cerebellum may be pressed upon. If the pressure be great, there may be paralysis, but, as a rule, death occurs before pressure is great enough to cause paralysis. There may be glycosuria in these cases. Tumors anywhere in the neighborhood of the third ventricle may cause the symptoms.

Lesion of the cerebellum when located in the hemispheres and not in the median lobe may not cause any symptoms. If the lesion is in the median lobe (vermis), disturbances of coördination peculiar in type occur. The ataxia exists only when the patient is in an upright position, and when he attempts to walk, he walks like a drunken man. The arms are seldom affected. Another characteristic symptom is vertigo, which is always increased when he opens his eyes. The ataxia and vertigo together strongly indicate disease in the middle lobe of the cerebellum.

Deficient development of the cerebellum is frequently found in congenital idiocy.

Lesions of the middle peduncles of the cerebellum cause a distinct tendency to assume a forced position, to turn toward or to fall toward one side in walking, or to revolve constantly about one axis of the body.

Bibliography.—Starr, Organic Nervous Diseases. Mills, The Nervous System and Its Diseases. Ferrier, Functions of the Brain. Jelliffe, The Thalamic Syndrome, Med. Record, 1910. Collins, Articles in Osler's Modern Medicine.

APHASIA.

Aphasia is the inability to express thought in words. In the function of speech there are three main elements: memory of words, both optic and auditory, understanding of words, and expression of words; and only when these three elements are complete in themselves and fully connected is intelligible speech possible. The localization of the speech elements in the brain is not at present definitely settled, and we have two theories of localization, that of Broca and Wernicke, and Marie's theory. According to the former, the center for the memory of spoken words (auditory word memory center) is situated in the superior temporal convolution, on the left side of the brain. The optic word memory center is in the posterior part of this convolution and in the angular gyrus. The center for word understanding cannot be localized. The center for word expression (center of motor speech) lies in Broca's convolution—the third frontal convolution, on the left side. These centers are connected by association tracts. Lesions of the superior temporal convolution give sensory aphasia, and lesions of Broca's center give motor aphasia.

According to Marie's theory, there is only one aphasia (sensory aphasia), and it is caused by lesions in what he calls the lenticular region, which includes the Island of Reil, the lenticular and caudate nuclei, the internal capsule, and the optic thalamus.

Aphasia can be studied under seven headings: (1) Motor aphasia; (2) Sensory aphasia; (3) Total aphasia; (4) Word deafness; (5) Transcortical aphasia; (6) Agnosia; and (7) Apraxia.

1. *Motor Aphasia.*—The lesion is in the cortex of Broca's convolution or immediately beneath it. The patient can usually speak a few disconnected words, but cannot express his thought. He cannot repeat spoken words, speak spontaneously, or read aloud. Writing is generally lost. However, the patient understands everything that is said to him and recognizes words.

2. *Sensory Aphasia.*—The lesson is in the cortex of the superior temporal convolution. Spontaneous speech is more or less lost, or else is paraphasic (the patient uses the wrong word; speaks a different word from the one meant). Repetition of words is lost or paraphasic. The writing is paragraphic (writing a wrong word), and likewise wrong words are used in reading aloud (paralexia). The understanding of spoken and written words is lost or much affected.

3. *Total Aphasia.*—Lesion destroying the entire region around the fossa of Sylvius. This is a combination of the

last two types. Speech understanding, reading, writing, spontaneous speech, and repetition of words are all lost.

4. *Word Deafness* (Subcortical Sensory Aphasia).—The patient can speak spontaneously, likewise read and write; but the understanding of words, together with the ability to repeat words and write from dictation, are lost.

5. *Transcortical Aphasia.*—Here the lesion interrupts the association paths between the center of word memory and that of word understanding. The clinical picture is similar to that of word deafness, except that the patient can repeat spoken words without understanding their meaning (echolalia), and can write from dictation.

6. *Agnosia.*—In this condition the patient is unable to connect a word with the object it represents, while the recognition of the word itself is retained. Likewise the patient can recognize objects, but cannot name them. We recognize two forms of agnosia, optic agnosia (psychic blindness), and auditory agnosia (psychic deafness). In the first form the patient can accurately describe an object seen, but cannot name it. In psychic deafness the patient can describe a well-known sound, such as the bark of a dog, but cannot name it or connect it with a dog. Word deafness and word blindness are also forms of agnosia.

7. *Apraxia.*—This is a disturbance of the knowledge of the use of objects. When the patient is given a well-known object he can name it, but is unable to make use of it; or, if he does try to use it, he does so as if it were something else. For instance, an apraxic patient will try to write with a hairbrush, comb his hair with a knife, or smoke a match as if it were a cigarette. The lesion causing aprexia is usually one which interrupts the fibers of the corpus callosum connecting the two cerebral hemispheres.

Bibliography.—A complete review of the subject of Aphasia will be found in Liepmann's article in Curschmann's "Lehrbuch der Nervenkrankheiten," 1909.

CHAPTER II.

DISEASES OF THE BRAIN.

APOPLEXY.

Apoplexy is a term which includes at least three different characteristic lesions—hemorrhage, thrombosis, and embolism of branches of the cerebral arteries.

CEREBRAL HEMORRHAGE.

Etiology.—Some persons appear predisposed; the disease occurs usually after forty years of age; it is more frequent in men; anything which tends to produce degeneration and disease of the cerebral arteries predisposes to it. Disease of the cerebral arteries is the prime cause. Under these circumstances any great increase in the arterial tension may cause rupture of the vessel.

Symptoms.—The attack is frequently ushered in without any warning; in other cases there are premonitory symptoms: dizziness, headache, numbness in the extremities on one side, mistakes in talking or writing, irritability. In the simplest attack the person falls suddenly, or rather slowly drops down, is confused, but may not lose consciousness; or if he does, it is only momentary, there is more or less paralysis on one side. In the more severe attack he loses consciousness, falls, breathes heavily; face is flushed, dusky, and swollen; profuse perspiration breaks out all over the body; the respiration becomes puffy; the arteries throb; the conjunctiva is injected; the eyelids are closed; the person lies in a heap, as it were. If the extremities are picked up, it will be found that they drop heavily when let go, but much more so on one side than on the other—the paralyzed side. Immediately after the attack the temperature is lowered, and in cases which die in a few hours it remains low. If death does not take place soon, there is a rise in the temperature, and if the condition does not progress favorably, the temperature keeps rising until it may reach 106° or 108° F. before death. In the cases which progress favorably the elevation in temperature subsides in oscillations to the normal. There are a number of localizing symptoms depending on the situation of the hemorrhage, whether cortical, subcortical, in the thalamus, pons, or medulla. If recovery from the immediate symptoms occurs, the person may be paralyzed on one side—arm, leg, and lower facial muscles—hemiplegia. If the hemorrhage occurs so as to injure the sensory tract in the posterior part of the internal capsule, there will be either permanent or passing hemianesthesia.

If the hemorrhage is on the left side, there may be aphasia. After a short time the person may be able to walk about; the paralyzed extremities become stiff; the joints are swollen and painful; the circulation is impaired; this early rigidity gives place to a certain amount of contracture. The reflexes on that side are exaggerated. No muscular wasting takes place, and the electric reactions are not changed. Very exceptionally an acute muscular wasting may occur, in which event it is found to be due to a secondary lesion in the anterior horns of the spinal cord. It occasionally happens that the onset of a cerebral hemorrhage is accompanied with convulsions; this is the case when the hemorrhage breaks into the ventricle or perforates the cortex, so that the blood is poured out into the base of the brain. Sufferers from cerebral hemorrhage rarely recover their former mental vigor; they are emotional, unable to do mental work, and in some cases there is marked mental enfeeblement or even dementia.

Pathologic Anatomy.--The greatest number of hemorrhages occur in the corpus striatum and its neighborhood. Charcot and Bouchard years ago pointed out that miliary aneurysms could be found in nearly all these cases; a form of periarteritis is the condition which leads to the formation of these aneurysms. Atheromatous changes in the vessels may also lead to rupture. It is believed that primary fatty degeneration of the vessels is the cause of the rupture and hemorrhage in young persons. After the hemorrhage has destroyed the motor fibers in the internal capsule a secondary degeneration downward takes place in the anterior pyramid in the medulla, and in the direct and crossed pyramidal tract in the spinal end. This degeneration in the cord is associated with the contracture and the exaggerated reflexes.

Prognosis.—This depends upon the extent of the hemorrhage; a study of the temperature will be found of service in all cases where the hemorrhage is at all extensive. Permanent hemiplegia is the result.

Treatment.—The clothing should be loosened, and the head placed in an easy position. Many observers have suggested lowering the arterial tension by the use of inhalations of nitrite of amyl, nitroglycerin, by the mouth or hypodermically. Gelsemium, aconitin, and other vascular depressants can be used. Venesection is advisable in many cases, especially in those with the so-called apoplectic habit. The contracture which occurs as a late symptom can best be ameliorated by massage, electricity, and passive motions.

OCCLUSION OF VESSELS (Embolic Closure; Thrombosis; Endarteritis; Thrombosis of Cerebral Sinuses).

Etiology.—Valvular disease of the heart, with fibrinous deposits, which may be washed off into the circulation; absorption of foreign material, like blood-clots, etc., from injuries of all kinds; portions of morbid growths, which may be detached and enter the circulation; disease of the blood-vessels which narrows their caliber (endarteritis) or roughens the internal surface (atheroma) and gives rise to a tendency to the deposit of fibrin at this point, altered conditions of the blood as the result of exhausting diarrhea, and other wasting diseases. Embolism is more common in the young; thrombosis and hemorrhage in the aged. Symptoms of embolic closure of an artery are very similar to those observed in cerebral hemorrhage; in fact, it is frequently impossible to make a differential diagnosis; the loss of consciousness is usually not so great in embolism, but as all degrees of loss of consciousness occur in cerebral hemorrhage, depending upon the extent of the hemorrhage and its location, this is not worth much as a differential point; the presence of decided valvular disease of the heart would be of more value, but even this does not make a positive differential diagnosis, as a rupture of a cerebral vessel is just as likely to occur in such a case. If the vessel plugged be large, such as the middle cerebral, which is the most commonly closed, and the left side most frequently, the area of subsequent softening is large, and we have the hemiplegia as found in cerebral hemorrhage.

Thrombosis.—The symptoms may come on very slowly, with many premonitory signs, and the paralysis is slowly progressive—not sudden as in hemorrhage and emboli. The paralysis is hemiplegic in type, and all the other symptoms found in cerebral hemorrhage are present.

Thrombosis of the cerebral sinuses occurs in children usually. The symptoms are indefinite: convulsions, headache, nausea, vomiting, spasmodic condition of various muscles of the eyes, face, and limbs are said to be present. This must be an exceedingly rare condition, and it is highly probable that some of the symptoms which have been attributed to thrombosis of the sinuses are due to anemia from exhausting disease or to an early stage of basilar meningitis.

Pathologic Anatomy.—Embolic plugs are formed either by fragments of fibrin washed off from the diseased valves of the heart or from fatty detrital masses from old blood extravasations after injuries which in the process of absorption enter the general circulation, or possibly from small detached portions of morbid growths in the large cavities of the body which encroach upon and open into a vessel, or from the deposit of fibrin in an aneurysmal dilatation, or from broken-down atheromatous patches. After the artery is plugged, softening of the cerebral tissue in the area of the arterial distribution occurs. The same occurs in thrombosis and endarteritis.

SPASTIC HEMIPLEGIA IN CHILDREN.

Etiology.—Most of the cases occur in the first three years of life, but they may occur even at a later period. The disease is caused possibly by abnormal conditions of the mother during pregnancy syphilis in the mother also plays a part. Accidents and injury to the mother are possible causes. Sinkler has insisted upon difficult and abnormal labors as a cause; injuries to the head. In those cases occurring after birth the infectious diseases form the principal causes.

Symptoms.—It often begins, just after birth, with convulsions, either local or generalized; there may be a series of convulsions, coming on at intervals and lasting several days, with hemiplegia, which remains permanent; or the child may die within the first twenty-four or thirty-six hours. The disease, when it occurs later in life, is usually ushered in by convulsions, with or without fever. After the convulsions *cease the child* is found hemiplegic; the face is not always affected; the hemiplegia is usually not cómplete, so that the child soon learns to walk, although awkwardly. As the child grows the paralyzed side does not develop so fully as the other; the bones may be shorter; in the majority of cases contracture takes place to a greater or less degree; the arm may be flexed, the hand flexed, and the fingers drawn in. The reflexes are exaggerated; there is considerable motion in the parts, and the leg is never so much affected as the arm. In some cases there is very slight contracture; sensation is usually not affected; the electric reactions of the muscles are normal. In quite a proportion of these cases, sooner or later, epileptic convulsions occur, and the convulsive seizures may be confined entirely to the paralyzed side; but in the majority of cases there is a general convulsion, with loss of consciousness, etc., and the paralyzed side is most convulsed. In a considerable proportion of these cases there is imbecility. It is not uncommon to meet with posthemiplegic trembling, posthemiplegic chorea, and athetosis. The hemiplegic trembling may be present only when the muscles are put on the stretch, or it may be continuous during the waking hours; it is not made worse by motion, as in disseminated sclerosis, but is rather diminished or entirely stopped by voluntary efforts. The tremor is apt to be large and not so fine, steady, and rhythmic as in paralysis agitans. The choreic movements are mainly confined to pronation and supination of the forearm and to flexion and extension of the elbow-joint. The movements are disorderly and irregular and cease during sleep.

Athetosis is a condition of constant motion in the fingers and hand. The patient is unable to keep them in any fixed position. These patients may live for years, and die of some intercurrent disease, of which phthisis is one of the most common forms.

In children there is also observed a spastic paraplegia. The symptom may date from birth, but it frequently is not observed until some time afterward, when it is found that the child, whose legs are rigid, does not move them freely, and learns to walk late, when it presents all the symptoms of spastic paraplegia in the adult. There is also a bilateral spastic hemiplegia. This is nothing more or less than a hemiplegia on both sides, due to a lesion in the motor tract of each hemisphere, with secondary degenerations in the

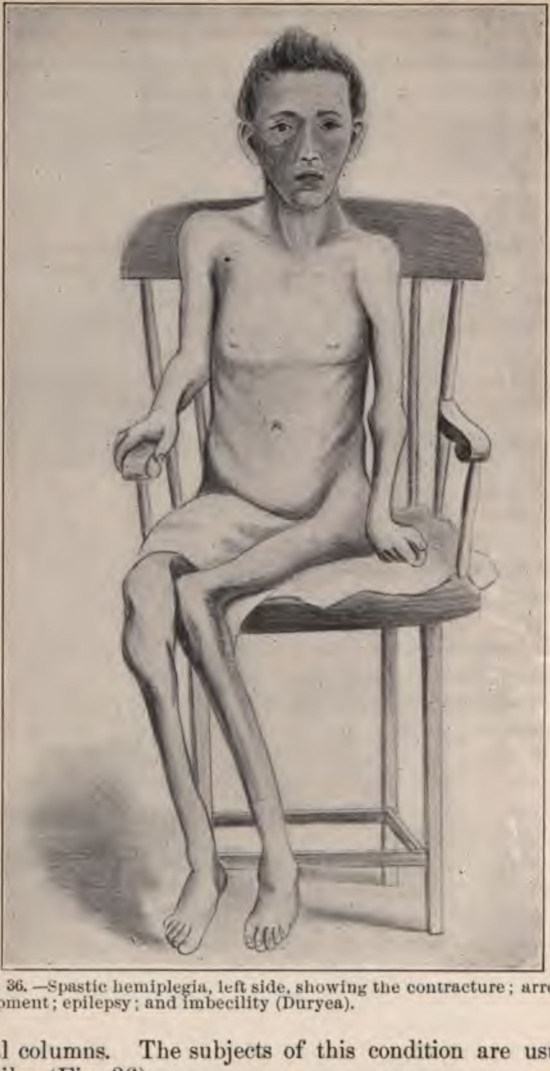

FIG. 36.—Spastic hemiplegia, left side, showing the contracture; arrests of development; epilepsy; and imbecility (Duryea).

lateral columns. The subjects of this condition are usually *imbeciles* (Fig. 36).

Pathologic Anatomy.—It is claimed by Strümpell that a large proportion of these cases are due to an acute polioencephalitis, analogous to the poliomyelitis of the anterior horns in children. This view is not accepted by all writers. The fact is that the lesions which give rise to this condition are not fully made out; they evidently depend upon a variety of pathologic changes. Meningeal hemorrhages, resulting from rupture of the vessels during a difficult labor, with perhaps a weak condition of the vessels, owing to nutritional disturbances during intra-uterine life, are undoubtedly a frequent cause of these cases occurring just or soon after labor, or as the result of injury in later life, or from fatty changes in the vessels during the eruptive fevers. The hemorrhage gives rise to convulsions and ultimate changes in the brain, with atrophy.

The loss of substance in some cases is very great, and frequently confined to the motor areas. A certain number of these cases are the result of polio-encephalitis.

Treatment is of very little use except to relieve the contracture by friction. About 70 per cent. of these children become epileptic.

Bibliography.—Freud, Die infantile Cerebrallähmungen, Nothnagel's series, 1897.

INTRACRANIAL TUMORS.

New growths may occur either in the cerebral substance itself or external to it, in the intracranial cavity.

Etiology.—Often there are no indications as to causation. They may develop secondary to tumors in other parts of the body; they are most apt to occur after tumors in the large cavities of the body—"secondary growths." Injuries are supposed to play a part in their development, and they may be the means of setting up the processes which give rise to the development of tubercular and syphilitic growths. Bramwell thinks they are more common in men than in women. Tuberculous tumors are most common in children and young persons; syphilitic tumors and gliomata in early and middle life. Sarcomatous tumors may also occur in young persons.

Symptoms.—The general symptoms are headache, more or less severe, often not located; frequently referred to a part distant from the seat of growth; they are most often generalized. Tumors developing in the pia or dura are more apt to give rise to severe headache than those developing in the cerebral substance.

Vertigo occurs in almost all the cases, but it is transient; there may be associated with these vertiginous attacks sudden falling to the ground, without convulsions, and very temporary loss of consciousness.

Vomiting is a very frequent symptom; it is sudden and explosive, especially when the growth is so situated as to cause pressure on the medulla.

Optic neuritis is found sooner or later in almost all these cases; it is important to make an ophthalmoscopic examination in all cases of suspected brain tumor, as optic neuritis may be present without any disturbance of vision.

Optic-nerve atrophy may be met with as the result of a primary neuritis in cases of tumors of long standing. In all these cases gradually failing vision with later complete blindness will occur. Three theories are offered to explain this optic neuritis: (1) Pressure and edema; (2) descending neuritis; (3) vasomotor irritation. It will be unnecessary to enter here into the explanation of these theories. There are additional symptoms which depend upon the location of the tumor: reference to the chapter on Localization in Diseases of the Brain and a study of the physiologic functions of the brain will make this clear. If the tumor is situated in the motor area, there may be localized spasm, with or without convulsions; subsequently, paralysis or paralysis coming on slowly. If in the visual centers, disorders of vision, etc. (Figs. 37, 38).

Tumors in the midbrain, in the neighborhood of the corpora quadrigemina, give rise to a combination of symptoms which have been described as ophthalmoplegia; it is true that this condition may depend upon pathologic changes other than tumor, such as lesions in the nerve nuclei or the periphery of the nerves involved. The symptoms are double ptosis and paralysis of the muscles of the eyeball supplied by the third nerve on both sides. These give the individual a peculiar appearance. The accompanying illustration will show clearly this condition, and for lack of space the student is referred to the articles given in the bibliography.

Diagnosis.—Gradual development of symptoms; headache, vomiting, epileptiform seizures, gradual onset of paralysis, according to motor areas involved; optic neuritis. If the tumor is at the base of the brain, there is gradual involvement of cranial nerves; if in the midbrain, progressive paralysis of the third nerve on both sides, etc.

Prognosis is unfavorable in all cases of cerebral tumor except in those which are clearly syphilitic.

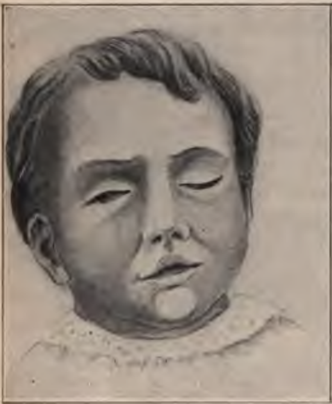

FIG. 37.—Ophthalmoplegia externa in a child three and a half years old from tumor in the midbrain, showing the double ptosis most marked on left side; personal case (Criado).

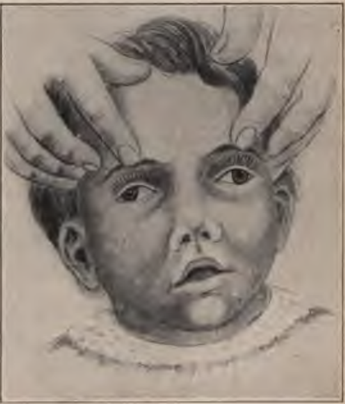

FIG. 38.—Showing the divergence of the eyeballs owing to paralysis of the internal rectus on each side. In the drawing it can be seen that the pupil on the left side is larger than on the right (Criado).

Treatment.—In the syphilitic tumors mercury and iodid of potassium in gradually increasing doses. Iodid sometimes ameliorates the symptoms in cases which are not syphilitic. When the growth can be localized in a superficial part of the brain, trephining should be done and the tumor removed, if possible. When the tumor lies where it cannot be reached, or when the localization is not known, and there are symptoms of increased intracranial pressure (vomiting and marked optic neuritis), a decompression operation may be done in the right subtemporal region.

Bibliography.—Bramwell, Tumors of the Brain. Mills, "Tumors of the Brain," Pepper's System of Medicine. Starr, "Ophthalmoplegia Externa," Journal Nervous and Mental Disease, 1888. B. Sachs, "Tumors of Midbrain," American Journal Medical Sciences, 1890. J. C. Shaw, "Ophthalmoplegia Externa," Brooklyn Medical Journal, 1891. Starr, Brain Surgery. Brüns, "Die Geschwulste des Gehirns; von Monakow, *ibid.*

ABSCESS OF THE BRAIN.

Etiology.—It is most commonly caused by disease and injuries of the bones of the skull and face.

Symptoms.—From injuries to the skull the symptoms are often more or less decided: headache, slight fever, chills, vertigo, nausea, and vomiting; there may be attacks of localized spasm in the face, arm, etc., according to the location of the lesion, and this may give place later to paralysis. If the condition progresses to a fatal termination, there are added slow pulse, delirium or stupor, dilated pupils, coma, and death; or the acute symptoms may subside, and the abscess run a chronic course, when a period may follow in which there are very few if any symptoms.

In abscess the result of disease of the bones of the ear, which is by far the most common cause, or of the nose or face, the symptoms are often obscure, and there may be no definite symptoms for a long time; when they are present, they are similar to those observed in abscess from injury.

In chronic abscess, headache, nausea, and vomiting, with occasionally fever, are the most common symptoms; they are like those observed in cerebral tumor; sometimes the terminal symptoms develop only a few hours or days before the fatal termination. If the abscess perforate the brain surface, there is added a purulent meningitis with all its symptoms. If it perforate the ventricle, there are almost surely convulsions; and if life is prolonged, a purulent basilar meningitis. If convulsions occur in cases of abscess, it may be localized or general. The convulsions and paralysis in these cases depend upon the seat of the abscess, and it is important if possible to locate them.

Abscess may occur anywhere in the brain. It is most common in the temporosphenoid lobe and cerebellum. In abscess of the cerebellum there is often a remarkable absence of symptoms, especially if located in one lobe, and death often occurs very suddenly from pressure on the medulla. I have several times observed as a symptom in these cases an unusual hunger, the persons eating much more than usual or complaining of hunger frequently; death followed in a few days or weeks.

Pathologic Anatomy.—The abscess may be of any size. The nerve elements are swollen, break down, forming a granular soft mass mixed with abundant pus-corpuscles and some blood; the connective-tissue elements may be increased; there is always an effort to encapsulate the abscess, and in the chronic cases the abscess wall may be of considerable thickness. In some cases of abscess from disease of the middle ear a narrow long sinus leads from the portion of brain over the diseased bone to the main abscess some distance away like the subterranean passageway into a mine. Around the abscess there may be considerable edema. Thrombosis, purulent or not, of the adjacent sinuses is often found.

Prognosis.—Unfavorable as a rule.

Treatment.—Medicinal treatment is useless. Trephining offers the only prospect of cure. For this purpose it is important that there should be localizing symptoms.

CHRONIC HYDROCEPHALUS (INTERNAL).

Etiology.—This is not clear. Hereditary predisposition appears to play some part; congenital syphilis is believed to have a causative influence; several children born in the same family may be hydrocephalic; traumatism to the mother may play a part in causing it. It may be caused by tumors of the cerebellum and its vicinity. It usually begins just before or soon after birth; it may be preceded by an acute attack.

Symptoms.—Convulsions, rolling of the eyes about and crying, are often observed just after birth; later the head is noted to be growing larger; but frequently no special symptoms are apparent until the child is several months old, when the head is found to be growing out of proportion to the body; the fontanels remain unclosed, and the child begins to have a peculiar way of rolling the eyes about. Fluid gradually increases in the ventricles, widening the skull at all parts; the frontal bones push forward, and the head sometimes become enormous. The child is dull and stupid, and as the pressure becomes greater the optic nerves may be so injured that sight is much impaired or lost. The disease is almost always fatal, but the child may live a long time. When it remains slight and its progress is arrested, it is not incompatible with great mental power.

SECTION V.

DISEASES OF OTHER ORGANS USUALLY INCLUDED UNDER DISEASES OF THE NERVOUS SYSTEM.

CHAPTER I.

DISEASES OF THE MUSCLES.

MUSCULAR DYSTROPHIES.

THIS is the name given to a class of muscular atrophies which are thought to be not of nervous origin, but are in the muscles themselves. Pseudohypertrophic muscular atrophy, the oldest known of this group, has always been considered among diseases of the nervous system, probably because of its resemblance to the group of myelopathic muscular atrophies and the suspicion that it also was due to some nerve changes.

PSEUDOHYPERTROPHIC MUSCULAR DYSTROPHY (Pseudohypertrophic Paralysis).

Etiology.—Males are oftenest affected; it occurs very often in several members of a family, but individual cases are also met with. In many cases there is no history of the ancestors having been affected. In other instances there is a hereditary transmission, and it is always through the mother, who may not be the subject of the disease herself. Children by two husbands but one mother have been known to develop the disease, thus showing an influence on the maternal side. It always begins very early in life; it may be first observed when the child begins to walk.

Symptoms.—Impairment of muscular power, as shown by difficulty and awkwardness in motion; often falls; finds difficulty in going up a stairs—takes hold of the banister to pull himself up by; the muscles may present nothing unusual; later an enlargement of some of the muscles may be observed, and this is most frequently in the calf muscles; this may be made more apparent by atrophy of the thigh muscles. The extensors of the knee and the gluteal and lumbar muscles are often enlarged and the infraspinatus (Gowers). The lower border of the pectoralis and latissimus dorsi are often wasted; the muscles of the forearm are affected only in a small proportion of the cases. The weakened muscles cause difficulties and peculiarities in movement: the walk is swaying from side to side; there is marked lordosis in some cases; there is marked difficulty in rising from the floor or from a seat or going up a step where there is no rail to hold on to; one hand is placed on the knee and the body is pushed up (Figs. 39, 40). The shortening and contracture which may occur in some of the muscles give rise to abnormal positions of the body and extremities; there may be contracture of the calf muscles, so that the heel cannot be brought to the ground. Curvature of the spine may occur as the result of muscular weakness. There may be diminution of electric reaction, but no degenerative reaction. The tendon-reflex is at first normal, but as the extensors of the knee atrophy, it is lost.

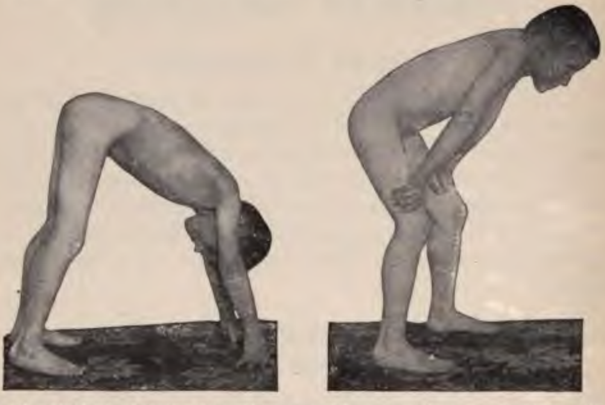

FIG. 39.—Method of rising from the ground in cases of myopathy (Church).

Pathologic Anatomy.—Atrophy of the muscles; absence and wasting of the fibers; the presence of large quantities of fat and connective tissue; the motor nerves have not been found diseased; and the spinal cord is normal. It is possibly a congenital defect in the construction and vitality of the muscle, so that it undergoes atrophic changes prematurely.

Diagnosis.—The age, the muscular hypertrophy in certain muscles and atrophy in others; the peculiar gait and mode of rising, etc.

Prognosis.—Not favorable; if the disease develops late, it is possible it may progress very slowly.

Treatment.—No treatment has been found beneficial. Gowers believes that muscular exercise has some influence in retarding the progress of the disease; massage and electricity may be of some service; if contractures occur, tenotomy may be resorted to for the relief of the deformities.

In the last decade there has been much activity in describing and dividing up into types, with special names, some of these muscular dystrophies.

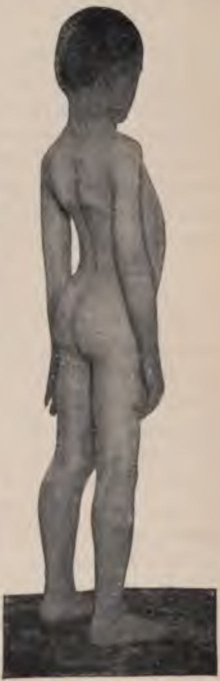

FIG. 40.—Position assumed after rising from the ground in cases of myopathy — cf. Fig. 39 (Church).

Erb's Juvenile Atrophy.—In 1884 (second article) Erb described a muscular wasting which has since been known under the above designation. It occurs in early childhood as a weakness and atrophy of the muscles of the shoulder, upper arm, pectoral region, thigh, and back; the forearm and leg muscles are said not to be affected for a long time. The atrophy may be associated with true or pseudohypertrophy of some muscles. Fibrillary contractions and reaction of degeneration are said never to be present. There are no sensory or vesical disorders. The wasting is in the pectorals, trapezius, latissimus dorsi, serratus, and rhomboids, as well as most of the upper-arm muscles, while the deltoids, supraspinatus and infraspinatus are either hypertrophied or normal for a long time.

More recently a variety has been described by Landouzy and Déjérine—the Landouzy-Déjérine or facioscapulohumeral type. It begins, as a rule, in early life and in the muscles of the face, and gives rise to a characteristic thickening of the lips which they have described as "tapir" mouth; later the atrophy affects the muscles of the shoulder and arms, supraspinatus and infraspinatus, and subscapularis; flexors of the hand and fingers remain normal; exceptionally it may begin in the muscles of the shoulder and arms or even in the lower extremities. It is distinctly hereditary; fibrillary contraction and reaction of degeneration are never present.

A variety has been described by Leyden as hereditary progressive muscular atrophy.

Heredity is the prominent cause in all these cases. The disease begins as a weakness and wasting in muscles or muscular groups at an early period of life. The tongue, muscles of mastication, and pharynx are never affected. The electric irritability may be diminished, but there is no reaction of degeneration. Some shortening of the muscles has been observed, especially of the calf muscles; deformities may occur, as in progressive muscular atrophy. Its course and duration are variable; it may remain confined to one part or extend to others.

(Brouardel and Gilbert, Traité de Medécine, vol. x., 1902.)

THOMSEN'S DISEASE.

This condition deserves a passing notice here. It is not frequently seen. It was first described by Thomsen, who was himself a sufferer. It is often inherited, and may appear in several members of a family. It is characterized by stiffness and rigidity of the muscles as soon as voluntary motion is attempted, and it may be so great as to prevent all motion. If they attempt to take hold of any article, the muscles contract very slowly, but when the object is once grasped, it is not readily released, as they in turn relax very slowly. Rest appears also to make the muscles stiff, and they experience great difficulty in beginning a voluntary act. In some cases the muscles of the back are affected and there is a spasmodic lordosis; the movements of the tongue may be interfered with, and a patient of Ballet and Marie found that if he turned his eyes upward they became fixed and he had difficulty in changing their position.

Its place in nosology is not definitely ascertained. It may be best grouped perhaps with the myoclonias and convulsive disorders.

CHAPTER II.

DISEASES OF DUCTLESS GLANDS.

EXOPHTHALMIC GOITER (Graves' Disease; Basedow's Disease).

Etiology.—This disease occurs almost exclusively in women. Heredity plays a part as a predisposing cause. Disturbances in nutrition, anemia, chlorosis, drains upon the system by profuse discharges of blood, illnesses which lower the vitality, are exciting causes of its outbreak. Mental anxiety and disappointments are fruitful sources of it in predisposed persons. It may occur in several members of the same family. It is well established now that this disease is due to a true hypertrophy of the thyroid gland with an increase of the thyroid secretion in the body fluids. All the symptoms except, possibly, the exophthalmos can be produced by giving large doses of thyroid gland extract. However, other theories are still held.

Symptoms.—It begins with palpitation, rapid pulse, which may reach eventually 120 or 150 beats a minute; it may begin gradually, or the symptoms may be ushered in suddenly, as the result of fright or other profound emotional disturbance. Enlargement of the thyroid gland occurs as a very constant accompaniment; the degree of enlargement varies very much; vomiting occasionally occurs, with dyspeptic symptoms, and there may be a disposition to vomit when certain kinds of food are taken. The appearance of these symptoms varies. In some cases there is a slight swelling of the thyroid gland in its entirety or in one lobe for a number of months before the palpitation occurs; in others the palpitation is the first to appear.

Exophthalmos, more or less extensive, soon appears; it may be so great that the lids cannot be closed over the eyeballs. Von Graefe pointed out that the upper lid loses its power of moving in harmony with the movements of the eyeball. In some extreme cases ulcerations of the cornea may occur and the sight be lost in consequence. Slight elevation of the temperature may occur. The person is exceedingly nervous, easily agitated, and frightened. The rapid pulse, a general nervous agitation, and restlessness with anxiety may precede for some time the other symptoms. There may be a moderate diarrhea in some cases, which may be persistent or intermittent. Occasionally edema of the eyelids is present. The group of symptoms that constitute Graves' disease have been known to occur suddenly upon intense emotional excitement of a depressing or terrifying character, and to disappear entirely after a few weeks (Fig. 41).

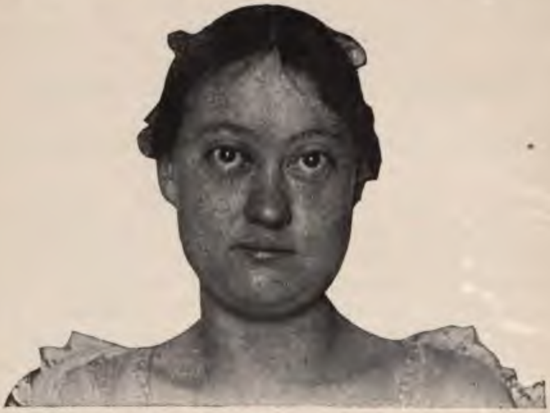

FIG. 41.—Exophthalmic goiter: partial recovery. Some exophthalmos, pigmentation of skin, and goitrous thickening remain (Church).

Pathologic Anatomy.—Changes have been found in the thyroid gland and in the cervical sympathetic and its ganglia. Greenfield, in speaking of these changes, says that what appears to be the earliest change in the thyroid gland is an alteration of the epithelium from the cubical to the columnar type, with greatly increased proliferation, similar to that seen in adenomata. In addition, there appear to be active secretion and absorption of colloid material, which is replaced by a more mucinous fluid. Desquamation of the altered epithelium is common; masses of columnar epithelium lie free in the spaces, which may be dilated. There are often elongated, duct-like spaces which suggest the idea of ducts in the gland. There is, in addition, the production of an enormous number of newly formed tubular spaces lined with a single coating of cubical epithelium, corresponding to the tubules of secreting glands. There is usually no increase in vascularity, but rather a diminution. In the central nervous system the changes were found mainly in the medulla oblongata and pons, but they are not distinctive. Minute hemorrhages were frequent; many were found in the floor of the fourth ventricle—dilated vessels filled with leukocytes. The ganglion-cells were found in a state of atrophy, with cloudy swelling of some of them. The changes in the sympathetic were of a similar nature.

Diagnosis.—When the symptoms are well developed, it presents no difficulty. Constant rapid pulse with general nervous agitation should make one suspicious of this disease in its early stage, when the symptoms cannot be readily accounted for by other morbid states.

Prognosis.—Many of the cases improve, but there is great danger of relapse.

Treatment is unsatisfactory. Digitalis and other remedies for slowing the heart's action have been given with very little result. If nutrition is impaired, tonics, quinin, arsenic, and iron, with nourishing diet, change of scene, cold sponging, galvanism, and removal of any source of anxiety which it is possible to relieve are needed. Faradism has been advocated.

Thyroidectomy, complete or partial, has been recommended and used in cases where other means have failed to give relief. It is not always successful, and there is some danger of death following rapidly after the operation, but the percentage of cases that have been benefited is sufficiently large to warrant an operation in severe cases where other means have failed. Thyroid gland has been used, but, on the whole, has given no good results. If the theory referring the symptoms to an increased and abnormal production of thyroid secretion is correct, it would be contraindicated. Thompson is the advocate of a line of treatment that is based upon a theory of the disease which he has propounded. His theory is that the symptoms are the result of the presence in the blood of a poison absorbed into the system from the intestinal tract, where fermentation- and decomposition-processes have been going on—gastro-intestinal ptomain poisoning. He advises a milk diet and the use of remedies to arrest intestinal fermentation, such as phenol-bismuth, salol, bismuth salicylate, etc. Galvanism to the enlarged gland and to the cervical sympathetic in the neck certainly diminishes, for a time at least, the pulse-rate and the size of the gland. Perhaps the frequent application of this remedy may give a permanent result. On the other hand, the pulse-rate and the size of the glands have been known to diminish without the use of galvanism. Freedom from anxiety and worry, with remedies to allay the nervous irritability, is of greatest importance. Belladonna in increasing doses has at times been of benefit. Glycerophosphate of soda has recently been recommended. Cervical sympathectomy is highly advocated by the Hungarian surgeon Jonnesco.

CRETINISM (Myxedema).

Myxedema in the child and in the adult are undoubtedly the same disease. The endemic cretinism which has been known for a long time, and which is almost entirely confined to certain localities in Europe, especially Switzerland and France, although having a resemblance to myxedema, is probably a very similar condition. Myxedema in the child was first described by Curling in 1850 under the name of "sporadic cretinism." The disease is usually observed very early in *life*—in fact, in some cases appears to be present from birth.

As the child reaches the age of one or two years the parents or friends observe that mental and physical growth is not so great as in other children of the same age; the child does not learn to walk at the age it should; perhaps even at this time there is observed an unusual puffiness or swelling of the face.

Later the child presents all the characteristic symptoms—a swollen appearance of the face, especially about the eyelids, also of the neck, hands, and to a less degree of the legs. The lower extremities are small and weak. The body is proportionately large, the abdomen especially so. The skin is coarse and dry; the hair is coarse and scanty. There is some defect in the circulation and nutrition, shown by the coldness and bluish appearance of the extremities. The tongue may be large; the lips are thick. There may be a tumor-like enlargement in the region of the shoulders and neck. The bowels are constipated, and the appetite is variable. The patients are pale and often present a wax-like appearance. The body is dwarfed. The facial expression is old and often ugly.

Mentally the children are dull and apathetic, are often unable to say more than a few words, and take little interest in their surroundings. They are usually disinclined to move. There is an arrest of development in the sexual organs in most cases. The degree of mental defect varies very much, and it is the same for the physical symptoms.

Pathology.—The affection is apparently the result of an arrest of development or disease of the thyroid gland. This gland has been absent in cases in which autopsies have been made.

Diagnosis.—In well-developed cases there is no difficulty in diagnosis. The dwarfed stature, the swollen appearance of the face, and the mental hebetude will direct attention to this condition.

MYXEDEMA.

Myxedema in the adult was first described by Sir William Gull in 1873, in an article entitled "On a Cretinoid State supervening in Adult Life in Women." In 1877 Ord suggested the name myxedema, because in one of his cases a quantity of mucin was found in the subcutaneous tissue. The disease begins in the adult about middle life; it may, however, occur in advanced life. The symptomatology is similar to that of the disease in children: hebetude, drowsiness, disinclination for mental and physical exercise, swollen, puffy appearance of the face and neck, a slight flush on the cheek, which varies very much in intensity in different cases; the lips are swollen; the tongue may be large; the eyelids are swollen and present a baggy appearance; the skin is dry and the hair may be coarse. The patients are slow in their movements and mental actions. The secretions are diminished. Delusions and hallucinations may occur in some cases. The temperature may be subnormal, the victims suffering from cold even in warm weather. The nails may become brittle, and the teeth decay.

Pathology.—Degeneration and atrophy of the thyroid are found in these cases.

Prognosis.—Under treatment great improvement takes place. The treatment must, however, be continued for a length of time and at intervals in the future.

Treatment.—Sheep's thyroid in some form must be given. The fresh glands were at one time administered; more recently a glycerin extract of the gland has been given hypodermically. The desiccated gland given by the mouth has, in my experience, been quite effective; 2½ grains to 5 grains once every other day is a sufficiently large dose to begin with; it may be increased to 5 grains a day if necessary. The remedy can be mixed with the food in the case of very young children. Diarrhea, excitement, rapid or weak pulse, vomiting, and general weakness show what are believed to be toxic effects of the thyroid. The dose should be diminished on the appearance of these symptoms.

ACROMEGALY (Gigantism).

In 1886 Pierre Marie first gave a description of this disease from a study of two cases in the wards of the elder Charcot. Since then contributions have been made to the subject by Marie and others. A summarized account of the condition only will be given here from Marie's articles.

Acromegaly is characterized by a remarkable enlargement of the extremities, hands, feet, and head. The hands are enormous, their form is regular, but their width is out of proportion to their length; the fingers present a "sausage-shaped" form; there is often swelling of the articulations of the first and second phalanges, with a certain flattening of the fingers in the anteroposterior direction. The palmar lines are exceedingly marked and bordered by large folds. The hypertrophy affects not only the skeleton, but to a marked degree the soft parts; it is especially developed at the upper part of the hand and its ulnar border. The nails are flattened, rather widened, and their lateral borders are sometimes curved up. The feet are enlarged; on their external border the mass of tissue forms an enormous pad. The malleoli are generally increased in size; to a less degree the head of the fibula and the upper extremity of the tibia; otherwise the size of the legs is not much increased. The knees often appear prominent, owing to increase in size of the patella and condyles of the femur. Diameter of the thigh unchanged. The head is increased in size and especially marked in the prominent parts of the face. The cranium is but little altered in shape and size; the face appears elongated vertically; the forehead is usually rather low, with marked prominence of orbital arches (due especially to dilatation of the frontal sinuses). The eyelids are often elongated and thickened; their tarsal cartilages may be hypertrophied. The nose is increased in all its dimensions—it is thickened; the cheeks are generally flattened and elongated; the cheek bones are prominent and bulky. The increase in the size of the lower lip contributes greatly to give the patient the remarkable physiognomy which makes him recognizable at a distance and at a glance. The lip

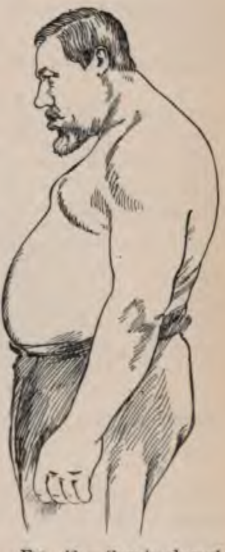

FIG. 42.—Cervicodorsal curvature of spine: chest and abdominal distortion in acromegaly (Marie).

is prominent and strongly everted. The upper lip may be a little thickened, but not comparable to the lower. The chin projects markedly downward and forward; it is large and massive; the lower jaw is increased in size, and as the upper jaw does not undergo the same modifications, a very marked degree of prognathism often ensues. The tongue is of large dimensions, and in some cases double its normal size; its shape remains perfectly regular; its increase is in all directions. These modifications of the tongue and lips sometimes interfere with articulation. The ears are sometimes increased in size. There is a marked kyphosis in the upper part of the dorsal region; the patient's head is buried in his shoulders in consequence. The vertebræ are very much hypertrophied. The neck is short and thick. There is an enormous increase in the thorax. Headache is present, and there are pains in joints in a certain number of cases. Mental hebetude or dulness is usually present. Many museum freaks—giants, etc.—are such cases (Figs. 42, 43).

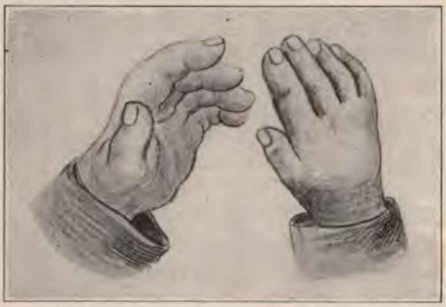

FIG. 43.—Showing the shape and size of the hands in acromegaly (drawn from an illustration by Marie).

Pathology.—The most constant change observed in acromegaly is that in the hypophysis cerebri. It consists usually of a hypertrophy of the gland substance, which goes on to the extent of becoming an adenoma. Sarcomata and gliomata of the gland have also been described in acromegaly.

SECTION VI.

THE PSYCHO-NEUROSES: DISORDERS OF UNDETERMINED PATHOGENY.

CHAPTER I.

NEURASTHENIA.

MANY individuals come into the world with tired nervous organizations. They are in a true sense of the word "born tired." They make up a large class of the inefficient and weak nervous men and women. The slightest exertion renders them incapable. If it so happens that they are possessed of sufficient money to live without labor, they become valetudinarians; otherwise many of them die.

Other individuals again have a fair amount of nervous capital; if not overdrawn, their bodies will respond to the strain; but if too much stress is laid upon the nervous system, it becomes tired and neurasthenia results.

The members of a third class are endowed with great nervous force. They make the great workers of the world; but even they, in the excess of their endeavors, tire their nervous system to the point of exhaustion and may develop neurasthenia. Of the numerous gradations, the limited space does not permit of discussion. It is only with average types that this section will deal.

Etiology.—Two forms of neurasthenia are recognized: 1. Congenital; 2. Acquired. The first form is due to the inheritance of a faulty nervous system. It may be noticeable from birth or develop at any time during the life of the individual. The second or acquired form comes either from overwork or illnesses. It usually occurs at a time of life when the anxieties and work inseparable from our mode of existence are in full operation. It is brought on frequently in men by too prolonged and anxious work and excesses of all kinds which lower the vitality; in women, by cares and petty annoyances, with an enervating mode of life, too rapid pregnancies, the drain from lactation, profuse discharges of blood. Exhausting diseases of all kinds may bring it on.

Symptoms.—It exhibits the most marked variation in its symptoms, and yet there is a similarity about them which makes the disease distinct and easily recognizable, at least in its typical manifestations. A number of divisions have been made, such as cerebral, spinal, and sexual neurasthenia; but these are purely arbitrary, and simply have for their basis a preponderance of symptoms referable to the brain, spine, or sexual apparatus, etc.; but, after all, the condition is general. The symptoms most commonly met with are inability for exertion; the person is easily tired, has no ability to do mental work; he is confused, gets headache on the least effort, has vague pains about the head, and neuralgic pains about the body, with sensations of prickling and numbness. The head and neck tire easily and ache; tender painful spots may be felt at one or more points along the spine; sleeplessness is common. The sufferers are apprehensive and unnecessarily anxious: dread they will have some serious disease. On the least exertion they have palpitation; perspiration breaks out on them, and they have flushing of the face; there may be heart fluttering which occurs at night and wakes them, causing them great distress and anxiety. They dislike to make mental and physical effort. Dyspepsia often comes on, either as a complication or was the original difficulty. When they take food, they are distressed and uncomfortable; the head symptoms are made worse. They are confused and dizzy; syncope may occur; they gradually leave out of their diet first one and then another article, until they reach the starvation point, making their condition worse rather than better.

Their attention becomes concentrated upon themselves and their organs. Many of them become hypochondriacal, often about their sexual apparatus, and they consult one physician after another. A feeling of constriction about the head, with discomfort and pain on the top of the head, is very common. These persons are usually pale and anemic, with appetite poor, bowels constipated, spirits depressed, and facial expression often anxious. They avoid strangers, and may develop morbid fears of all kinds. They remain in the house on the plea that going out makes them uncomfortable, increases the pains in the back and head—tires them; or they dread that something will happen to them—that they will faint or have an attack of paralysis, etc.

The grave forms of neurasthenia which depend upon heredity, instability, and excessive irritability of the nervous system may be manifested early in life—in fact, sometimes in very young children. In this condition we are on the border-lines of some of the psychoses, which appear often to be dove-tailed in with each other, such as hysteria and some of the milder psychoses. We may also find them mixed with the not fully developed paranoias. This inherited unstable state of the nervous system depends evidently upon some defect in the power of the neurons to assimilate and store up nutrition and force in sufficient quantity and with sufficient rapidity to carry on fully and easily the work of life.

These nervous systems are too easily influenced and disturbed by peripheral irritations, by external conditions, and by the presence of any slight abnormal products in the blood-supply. There is not a proper harmony between the operations of the various parts of the central nervous apparatus. The inhibitory centers are defective and weak. The entire organism often appears weak, or rather excessively irritable, and its nerve-supply is oversensitive. The ordinary conditions of life, the atmospheric conditions, the food usually eaten, give rise to irritation, and through the digestive apparatus affect unduly the nervous system. These trivial disorders in the viscera give rise to many of the aches and pains about the body, such as those in the back, etc.

The functions of the sexual apparatus also produce unusual sensory disorders and mental anxieties. Here we must place the cases of so-called sexual neurasthenia. The individuals, especially young men, who, with other neurasthenic symptoms which must sometimes be sought for, complain of emissions of semen at night, or believe themselves the subjects of losses of semen in the urine, attribute all their ill feelings to this supposed cause; and here we usually find the influence of suggestion through the reading of advertisements, etc. The mental state of most of these cases of neurasthenia is, like the other nervous manifestations, unstable—in some directions weak. The patients are the subjects of anxieties and fears as to their physical and mental state, and are easily affected by suggestions, made in the way of remarks or statements, about the illnesses of other persons. What they read in the newspapers in reference to diseases, murders, suicides, etc., makes a profound impression on them and throws them into a state of anxiety and apprehension. They at once believe themselves the subjects of this or that disease or condition they have heard or read about. This mental worry adds a group of symptoms the result of fear. Strange to say, they often seek out in the newspapers, or are anxious to discuss with their acquaintances, the subjects of which they have so much dread and anxiety. Their thoughts are always on themselves and their condition, which they look upon with great anxiety and hopelessness. They are easily disturbed by a word inadvertently spoken by a physician. There are often palpitations, sensations of suffocation, oppression, and a feeling of internal tremor.

Prognosis.—The majority of these invalids recover under suitable treatment.

Treatment.—Remove the causes which have operated to bring about the condition; avoid overwork and, above all, anxiety, if that be possible; stop any drains which are being made on the system, such as hemorrhages, lactation, etc. A good ample supply of food is most important, with fat of some kind in the winter; cod-liver oil or cream can be used. Medicinally, tincture of nux vomica may be taken before meals, with pepsin after meals, and if there is much gas formed in the stomach and intestines, charcoal may be added. The bowels should be kept regular with cascara sagrada, or the small granules of aloin, belladonna, and strychnin can be given at night. If there is much anemia, later, quinin and iron or arsenic can be given. The person should live out-of-doors, if the weather admits, and if possible remove to some new locality, temporarily, with cheerful surroundings. He should be encouraged to take moderate exercise at first, gradually increasing it, but never to excess. Cold sponging in the morning is of service in a large number of cases.

Stimulants should be avoided. This line of treatment should be continued for a long time. The mental condition of these persons should always be kept in mind in their treatment. Much can be done by convincing them of the groundlessness of some of their fears and aiding them by encouragement. During the summer months these patients should live out-of-doors, preferably in a mountainous region.

TRAUMATIC NEUROSIS.

This is a type of psycho-neurosis that is occasioned by severe shock. It may simulate many different organic nervous diseases and is at times difficult to recognize. The acuteness of the onset and the causative trauma are important differential points. It rarely occurs in those of sound nervous organizations, and when the factor of litigation and damage suits complicates, the picture becomes very frequently that of a mild insanity.

Many of these patients recover at the close of a suit, whether they win or not.

Bibliography.—Beard, Nervous Exhaustion. Bailey, Accident and Injury. Saville, Neurasthenia.

CHAPTER II.

MOTOR NEUROSES.

OCCUPATION NEUROSES.

THE general muscular weakness which is so pronounced in neurasthenia in general by reason of special work thrown upon one muscle or group of muscles may develop in that muscle or group of muscles a markedly paretic condition, particularly for a certain movement coördination. This may or may not be associated with cramps in the muscle. A large variety of these neuroses have been described. Some of these muscle tires lead to muscle atrophy.

It may be that the pathogeny of these affections is purely muscular, but as most cases occur in neuropathic individuals, there is strong reason to believe that the nervous system is primarily involved.

Writer's Cramp.—Writer's cramp is one of this group, occurring in persons of a highly nervous temperament and of neuropathic inheritance, and developed by special occupations. It is a spasm in the muscles associated in the performance of some work requiring delicacy and more or less long-continued or severe action of those muscles, such as is required in writing, pianoforte playing, sewing, telegraphing, etc. In some of the cases as soon as the person attempts to use the hand the muscles are seized with tonic or clonic spasms, so that the intended act cannot be performed. In others the attempt to use the hand brings on a tremulous condition, and if writing be the act attempted, it is uneven, coarse, and imperfect. In others, and perhaps the most common manifestation of the difficulty, the person experiences great fatigue, weakness, and aching in the hand and forearm, at times even in the shoulder; if the work or the pen be laid aside, the feeling may disappear. In such persons, if they attempt to write with the left hand, sooner or later it is affected in the same way as the right.

Other occupation neuroses are telegrapher's cramp, musician's cramp, tailor's spasm, milker's cramp, cigar-roller's, and ballet-dancer's cramp. Typewriters, dentists, golfers, billiard players, painters, and many others develop similar conditions.

Rest, tonics, and change of occupation constitute the only treatment.

THE MUSCULAR SPASMS OR TICS.

Spasmodic involuntary movements are very common and are found in all degrees from a simple habit-spasm to grave general choreic movements.

Habit-spasms.—These are often found in children and may be the remains of a chorea or they may be a continuance of an habitual movement made by the child—at first in play and later become uncontrollable. Meige and Feindel,[1] in an important monograph on "Tics," maintain that most of the tic movements, even the most complicated, have a like origin.

---

[1] For a consideration of tics see Henry Meige and E. Feindel, *Les Tics et leur Traitement*, Masson and Cie, Paris, 1902.

A study of the cases and reference to the diagram of the nerves and their distribution to the muscles will be a guide. The commonly met with spasmodic conditions are as follows:

Spinal Accessory Spasm.—It may be tonic or clonic. It is usually observed in persons of a strong neuropathic tendency—those whose families are the subjects of hysteria, insanity, and other nervous disorders.

The immediate cause and the exact location of the irritation which gives rise to these spasms are unknown, but it seems more than probable that they have their origin in the cortex. If the spasm affects the sternocleidomastoid, the head is drawn backward and to one side, the chin turned upward and to one side, and raised. If the trapezius is affected, the head is drawn backward and toward the affected side without rotation of the chin; the shoulder is raised. It is rarely confined to the muscles supplied by the spinal accessory; the splenius is often affected; lateral curvature of the spine may be observed in some of the chronic cases. It usually begins with uneasiness in the neck. Soon the head begins to be turned slowly to one side; as soon as the spasm relaxes, the head returns to the normal attitude. The spasm is repeated again in a short time with the same relaxation. The frequency with which this recurs varies. As the condition becomes more chronic the head may remain permanently in that position. At first, by an effort of the will or the hand, the head can be brought to the normal position, but it at once, upon being released, returns to the abnormal attitude.

Prognosis is not favorable in these cases. Some of them recover, but very few, and there is a great tendency for them to relapse.

Treatment is most unsatisfactory: of medicines, hypodermic injections of atropin in gradually increasing doses, beginning with $\frac{1}{200}$ or $\frac{1}{300}$ of a grain twice a day, gives the best results, but it is not always successful. The nerve and the muscles have been divided, but no permanent good results have been obtained. Section of the supplying nerve controls the muscles of a certain group, but other groups later frequently become implicated.

Unilateral Facial Spasm.—Symptoms.—Clonic spasm in the distribution of the facial nerve: the muscles about the eye are more constantly the seat of the spasm, even when all the muscles take part paroxysmally in this spasm. Some cases are so severe that for the time being the eye is entirely closed, and the mouth drawn far to one side; the alæ of the nose also drawn up. It may last for years, but there are times when the paroxysms are much more frequent and severe than at others.

Treatment.—There is no treatment which gives the slightest relief in these cases, and this after the most careful trial of all kinds of medicaments and electricity. Psychic modes of treatment offer the most hope.

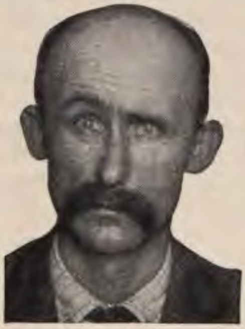

FIG. 44.—Facial palsy of left side. Bilateral attempt to raise eyebrows (Church).

Torticollis (Wry-neck).—This consists of a clonic or tonic spasm of the muscles supplied by the spinal accessory. At least four general types are noted: (1) Congenital; (2) symptomatic; (3) false; (4) spasmodic. Women are affected more often than men.

The symptoms consist of feelings of slight discomfort or pain in the neck, followed by the acute, sudden, sharp contraction of the sternocleidomastoid and portions of the trapezius. The chin is thrown upward, the head rotated to the opposite side, and inclined toward the affected side. The condition may last for a few moments only and then the muscles relax, or the convulsion may become tonic and the position a permanent one, with atrophy of the opposing muscles and hypertrophy of those muscle-fibers which are contracted. The treatment is very difficult and unsatisfactory. (See Fig. 45.)

Facial spasm (mimic tic) is usually unilateral and consists of sudden contractions of the muscles of the face. These patients often make very peculiar grimaces.

Nodding spasm is another type in which rhythmic nodding or oscillatory movements of the head may occur. It occurs in badly nourished children and is closely allied to chorea.

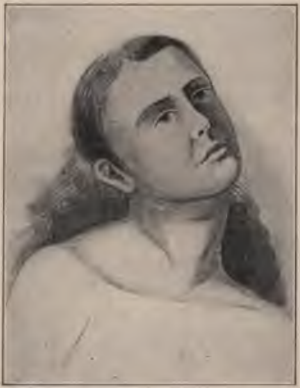

FIG. 45.—Showing position of neck in torticollis.

Spasmodic Tic of Gilles de la Tourette.—This is a spasmodic condition affecting the upper extremities, associated with coprolalia, grimaces, and contortions.

Tetany is the name given to a form of spasmodic muscular movements most often seen in children and by many mistaken for epilepsy. During an attack the hands are often strongly flexed, the arms and elbows are drawn up, while the legs are extended almost in talipes. Insufficient function of the parathyroid gland undoubtedly plays a part in the etiology, as likewise disordered calcium metabolism with a decrease of calcium salts in the body fluids.

Not only are the voluntary muscles of the body subject to these spasmodic convulsive disorders, but gastric, vesical, respiratory, rectal, and other *tics* or *convulsions* or *fits* may be recognized.

CHOREA.

Etiology.—It affects chiefly children—girls more frequently than boys; it may be due to anything which tends to lower the general vitality. There appears to exist a relationship between chorea and rheumatism. Fright, anxiety, overstrain at school, with confinement, are exciting causes in those predisposed. Toxic states can now be included in the list of causes. Chorea frequently follows infections, and there is good reason to believe that some choreas are due to specific infectious agents.

Symptoms.—The child becomes listless and inattentive, and neglects its school work; the intellect is dulled. Irregular muscular twitchings in the face or in one arm, or in one arm and in one leg, soon begin to develop. Occasionally there is paresis of one side as the first symptom; the muscular twitchings cause constant facial distortions; the arm is jerked from side to side in paroxysms; the child holds the affected hand with the sound one to prevent these movements. The choreic twitchings may be general, and it is almost impossible for the child to use its limbs; it stumbles and falls in any direction. Cases may be seen in which all extremities, head, eyes, and muscles of the throat are affected; it is almost impossible for these children to speak or to swallow.

While these muscles are twitching at intervals, throwing the parts into undesired positions, they are paretic; the arms and legs cannot be moved voluntarily, and the head drops in any direction if unsupported. Besides the pains in the limbs which some children complain of, there are no sensory symptoms. The little sufferers are always irritable, depressed, emotional, and mentally inactive; if kept at school, they cannot learn and take no interest in their studies. There is an endocardial murmur in some cases; the pulse may be irregular and weak. There may be several attacks, with intervals of a few months or years.

Pathologic Anatomy.—There are no distinctive lesions in chorea. Dana has attempted to sum up what is known of the changes.[1] These consist of subcortical and basal hyperemia, paralyzed, dilated, and badly nourished arteries, exudations in the lymph-spaces, and similar changes which are evidently secondary.

Prognosis and Duration.—The prognosis is favorable in almost all these cases, especially the acute; the duration under treatment is usually from four to eight weeks.

Treatment.—This should consist in removal of any cause which can be discovered. The bowels and digestion should be regulated; ample light nutritious diet, with cold sponging night and morning; abundance of fresh air; avoidance of close rooms: the bedrooms should be well ventilated, especially at night, keeping the children out-of-doors as much as possible. Absolute rest in bed has been advised, and may be suitable for those cases where there are excessively disordered movements or paresis associated with them. In other cases the children should be kept out-of-doors, and they should be encouraged to play about. If there is much pain or a slightly elevated temperature, a few doses of antipyrin may be given, provided there is no serious heart lesion. If the child is in very poor physical condition, cod-liver oil may be given. For the medicinal treatment, Fowler's solution gives the best results. Pyrophosphate of iron is also useful. Rheumatic cases usually react well to salicylate medication.

Hereditary Chorea.—This is a condition which was first mentioned by Dr. Waters, of Franklin, N. Y., in a letter to Dunglison in 1842. It was a form of chorea found in certain families in his neighborhood; it was hereditary; rarely appeared before adult life; was incurable; and dementia always followed. Twenty years later Lyon wrote about it;[2] he gave three histories in which five and three generations were affected.

In 1872 Huntingdon described it in a few cases on Long Island. He says that it affects males more frequently than females, and comes on gradually, always after middle life, and is incurable; it always ends in insanity, and there is a tendency to suicide. In most of the cases the disease is hereditary and affects a great many members of a family, and for several generations; it affects both sexes, and begins usually after twenty-five years of age; it may be transmitted through the paternal or maternal side. It does not develop from ordinary chorea, and begins without apparent cause by a twitching of the face, then the arms are affected, and later the legs, or it may begin as a general twitching. The movements may be violent and coarse in character; in the leg it produces a peculiar gait: there is sudden stopping; the persons look as if they were going to fall forward; the body sways; at last they are able to take a few rapid steps, and so recover their balance. In most cases the movements cease in sleep. There is no wasting of the muscles; no anesthesia; the deep reflexes are normal or somewhat increased; the electric reactions are normal. There is no heart disease; rheumatism is not associated with it, as in ordinary chorea. The bodily functions are normal. It is very commonly followed by some mental disorder. The choreic insanity begins with loss of memory and childishness, gradually passing into dementia.

---

[1] *Brain*, 1890.

[2] *American Medical Times*, 1863.

Pathologic Anatomy.—Several autopsies made in the past few years have shown meningitis and pachymeningitis, atrophy of the convolutions, thickening of the blood-vessels, and atheromatous changes. Other authors report miliary encephalitic lesions in the cortex and white matter of the motor region.

PARALYSIS AGITANS.

This is a disease of advanced life; men are most frequently affected by it. It is evidently connected with degenerations of advancing years.

Symptoms.—It may begin slowly or somewhat suddenly; there may be some pains in the extremities, insomnia, and irritability, but these are frequently absent. The disease usually begins as a trembling in the muscles of one hand: at first it may be intermittent, but later it is constant, except when asleep. The tremor is a slow, rhythmic movement; the attitude of the hand is peculiar: the wrist is slightly flexed; the fingers bent downward; the thumb lightly opposed to the index and middle finger. The tremor may for a long time be confined to one arm or extend to the leg of the same side; it is never so marked in the lower extremity as in the upper; the head may also be involved, and the tremor may even begin in the head. The speech is often slow, and, as the disease progresses, muscular rigidity occurs to a certain extent, especially in the muscles of the back, so that the spine is more or less fixed; this gives rise to a peculiar, bent-forward attitude; the head is inclined on the chest; in speaking, the person turns the eyes up. The gait is characteristic: the person rises very slowly and with some difficulty from his seat. It is found that some persons show a tendency to run forward, and Charcot found that pulling on the back of the dress of one of his patients caused a tendency to retropulsion. There are at times uncomfortable sensations about the body, but one which is almost constant is a sensation of heat and burning; the person sleeps with very little covering. As the disease progresses the health fails, the mind grows weaker, bedsores may form, and death is caused by some intercurrent disease. Death may occur from pneumonia, pleuritis, etc. There are occasionally observed cases of this disease without the trembling. (See Figs. 46, 47.)

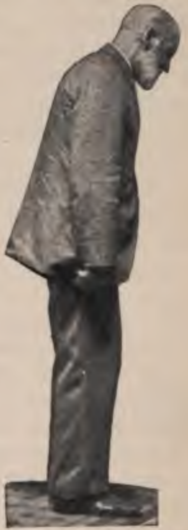

FIG. 46.—Parkinson's disease (attitude) (Church).

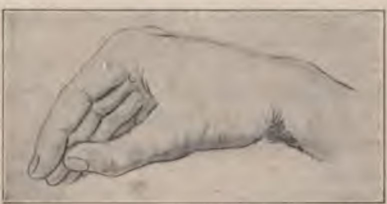

FIG. 47.—Showing "pill-rolling" position of hand in paralysis agitans (after Charcot).

Pathologic Anatomy.—Sclerotic changes in the white matter of the spinal cord have been described. Interference with the cerebello-spinal fibers may play a part in the genesis of the tremors.

Prognosis.—It is a slowly progressive disease.

Treatment.—This is only palliative: attention to the general health; light nutritious diet. Tonics may be given; a host of remedies have been given, but they are all useless. Morphin may give some relief to the burning. Small doses of hyoscin hydrobromate, $\frac{1}{200}$ grain two or three times a day, diminish the tremor and give relief. There should be freedom from work and anxiety. If there is insomnia, sodium bromid, urethan, sulphonal, etc., may be used at intervals.

EPILEPSIES.

This can no longer be considered one disease, as there undoubtedly exist many different epilepsies which formerly were put into one big group. Alcoholic and arteriosclerotic epilepsies have been differentiated.

Etiology.—A neuropathic family history is to be traced in almost all the cases; rarely there is direct transmission. It occurs most frequently for the first time among young persons, and is most common between ten and twenty years of age. As exciting causes, intense emotional excitement, fright, irritations (peripheral) of all kinds, from the intestinal tract, etc.; febrile diseases, injuries to the head, and falls are frequent exciting causes in these predisposed children. Brain injuries at birth are responsible for a large number of epileptics.

Symptoms.—Frequently the first attack occurs without warning; the child falls and is convulsed. In a proportion of the cases there is a premonitory symptom called an aura. This may be a localized spasm occurring in the hand, or even in a finger, or on the side of the face, and extending to other parts (this is the type of Jacksonian epilepsy), followed by general convulsion.

It is sometimes a question whether an aura is motor or sensory, as in some cases it may be due to a very slight spasmodic wave which is not perceptible even in the extremities, but especially in those auræ from the viscera, or if they be purely sensory, as usually described by the patient. The sensory aura is the most common perhaps; it is a feeling of tingling or numbness in the parts, which extends up to the head. They sometimes speak of it as "something running up the leg" or arm or from the epigastrium. At any rate it is a peculiar, indescribable sensation which these persons experience, apparently starting at some point in the body and radiating toward the cephalic extremity—apparently, because it is really due to central irritation, and what is felt is really a "referred sensation."

The auræ may be visual, when the person sees flashes of light, color, or even distinct objects, such as persons, animals, or even scenes; or they may be auditory, when he hears noises, voices, music, or singing; or olfactory, when he smells odors, which are disagreeable usually, such as of sulphur, decaying animal matter, etc., or they may be pleasant. There are also psychic auræ: the person experiences a feeling of fright and dread or he is in a confused, dreamy state.

The attacks are of two kinds—*petit mal* and *grand mal;* both of these forms of attack may occur in the same person. The attacks of petit mal are characterized by sudden loss of consciousness, temporary in duration; the person stops in any act which he is performing, and stares fixedly before him. He may remain perfectly quiet, and as soon as the attack ceases, resumes the acts he was performing before it; or he may jump up and hurriedly move about, opening a door or pulling up a curtain, etc., or start to undress, or running ahead a distance (precursive epilepsy). There usually is a slight tonic spasm of the entire body in these attacks, but no clonic convulsion. Loss of consciousness is not an absolutely necessary factor.

The attacks of grand mal are ushered in by pallor, by dilated pupils, often by a loud, piercing scream, simultaneous with loss of consciousness, falling to the floor, tonic convulsions. The face now becomes livid; clonic convulsions succeed the tonic; the head and eyes are often turned to one side; the arms and legs are thrown about in all directions; there is frothing at the mouth; biting of the tongue, which colors the saliva with blood; urine is passed; respiration is difficult and deep. Then there is a period of cessation of all the symptoms, after which the person may fall into a deep sleep. In some cases this convulsion is soon succeeded by another, and there may be any number of attacks following one another, constituting "status epilepticus," during which the temperature rises very high, and in some cases the person is found paralyzed on one side after the attacks cease, —postepileptic paralysis,—from which he recovers. In other cases the attacks are characterized entirely by psychic disturbances. The patient may undress in the street, expose his person, or he may even commit crimes, such as breaking things, or killing his own children or other people; or he may shout and sing, and have a true maniacal seizure. After the attacks of grand mal he always complains of being sore in the muscles, owing to their convulsive action; and there are frequently small ecchymotic spots under the skin.

Prognosis.—This is a chronic condition. Some cases are very much benefited by treatment, and in a few cases cure occurs.

Treatment.—Attention to the diet and the regimen is the most efficient agency in the treatment of this condition. The use of bromids, given cautiously and watched, increasing the dose gradually, is of great value in the acute stages of the disease. Avoid stupefying the patient. The bromid should be given between meals, in water or Vichy, as recommended by Seguin. Absolute withdrawal of all salt from the food of the patient seems to allow a better action of the bromids with smaller doses. Tonics are indicated in these cases, and quinin is the best, in small doses; or small doses of arsenic, cod-liver oil, and nutritious food; if there is a tendency to indigestion, pepsin may be given. In those cases where a study of the convulsive seizure or sensory aura gives evidence of a localized lesion, and in all cases due to fracture of the skull, the question of trephining may have to be considered.

Bibliography.—Gowers, Epilepsy, London, 1901. Féré, Epilepsie. Binswanger, in Nothnagel's series. Oppenheim, "Nervenkrankheiten," 1908.

CHAPTER III.

VASOMOTOR NEUROSES.

There is a large class of affections in which the symptoms are largely referred to the circulatory system. By many they are regarded as affections of the sympathetic nervous system. In some the blood-vessels themselves play an important part in the development, if not the causation, of the phenomena. Their pathology, however, is quite undetermined, and they present at best a motley group, with, at times, certain superficial resemblances.

Headache, cephalalgia, or migraine proper is placed in this group for lack of better nosologic position.

HEADACHE (Cephalalgia).

Headache, the result of organic brain disease, such as tumor, is not included under this head.

Any cause which lowers the general tone may give rise to it, such as anemia from any source, the presence in the blood of material foreign to it, or the permeation of the organism by poisonous substances—tobacco, lead, products of defective assimilation, etc. It may be the result of irritations and disturbances in other parts of the organism, such as disorders of the stomach, constipation, disease of the teeth, nose, throat, or eye; or it may occur from sleeping in badly ventilated rooms, from the inhalation of deleterious gases. It also occurs in gout, in rheumatism, and in neurasthenic individuals. It varies very much in its severity; it may be constant or intermittent, general or localized. An attempt has been made to classify these headaches according to their cause, and it is believed that certain sources of irritation give rise to a headache localized in a special part of the head; for instance, the headache of indigestion and constipation is frontal, while the headache of anemia is on the top of the head. The location of the headache is not always a guide to its etiology.

Anemic headache occurs mostly in women; it may be diffuse, on the top of the head, or the temples; it is found in pale and bloodless persons; it is often associated with fainting attacks; it is made worse by want of nourishment, rest, and sleep; overwork and anxiety increase it.

Congestive headache is found mostly in men, and is associated with full vessels, congested face, throbbing arteries, and vertigo, with a feeling of fulness in head.

Hysteric and neurasthenic headaches are very much alike, and are often located on the top of the head or on one side, described as boring; made worse by worry and menstruation.

Toxic headaches are usually general, but they may be frontal; tobacco, opium, iron, and other drugs may cause it. Seguin has pointed out that the headache of uremia is often occipital.

Syphilitic headache is often very severe, and may be general or localized; is apt to be worse at night; is usually constant.

Headache occurs in children who are of a nervous temperament and use their eyes too constantly or tax their brain beyond its endurance and powers, and who are worried and anxious about their work. Sinkler says it may be associated with enlarged tonsils.

The treatment of headache must depend upon its cause; this must be sought after. In the anemic headaches, tonics, arsenic, iron combined with a saline, if the person will tolerate it; nutritious food; some wine; cold bathing with friction. The digestion should be strengthened with some stomachic bitters, or pepsin may be given after meals; the bowels should be kept regular. In the syphilitic headache iodid of potassium; in the hysteric and neurasthenic headaches the treatment indicated for the anemic form is of service. In toxic headaches the cause must be removed. In nervous, highly neuropathic children, avoidance of overwork and anxiety, plenty of fresh air out-of-doors, plenty of light, nutritious food, cold bathing. In those cases which appear to depend upon strain of the eyes, if there is refractive trouble, it should be corrected, but this alone, in my experience, does not always cure the headache, but for the time relieves it; there is a neurotic condition, the basis of the cephalalgia; all sources of peripheral irritation should be sought for and corrected. The newer analgesics, antipyrin, acetanilid, phenacetin (5–10 grs.) are the best general remedies for headaches. They may best be combined with caffein, bromids, etc.

HEMICRANIA (Migraine; Sick Headache).

This is apparently a vasomotor neurosis with some special manifestations. Its most common cause is heredity and a neuropathic constitution. It is more than likely that its universality leads to an incorrect estimate concerning its relationships to the neuropathic constitution. While it seems perfectly true that many neuropaths have migraine, it is also just as true that many people have migraine who are not neuropathic. Excessive fatigue, anxiety, and worry often bring on an attack. It often begins in childhood or youth, and ceases at forty or fifty, but it may begin in advanced life. Intestinal toxemia is probably the most important exciting agent. It is most common in women.

It is characterized by headache which comes on in paroxysms and lasts for many hours. It is frequently located in one temple, and it is said in the left side most frequently. In a large proportion of the cases, however, it is more or less diffuse, extending backward to the occiput and neck or the top of the head, or it may be on both sides. The pain is usually dull, severe, and deep-seated, but there may be, from time to time, stabbing pain, as in common neuralgia of the fifth nerve. At the outset or during the attack there may be tingling and numbness in the side of the face or arm; indistinctness of vision, hemianopsia, difficulty in speaking, aphasia, flashes of colored light before eyes. The arteries of the side of greatest pain may pulsate with great force; the face may be red or pale; light, noise, and motion are distressing; vomiting may or may not occur; the pupil may be slightly dilated on the side of greatest pain. As the attack subsides there is an abundant secretion of pale urine. The frequency with which these attacks occur varies very much. It is susceptible of relief, but it is not curable. In the great majority of cases the visual phenomena precede the onset of the pain by some twenty to thirty minutes.

Treatment.—If the nutrition is impaired, as it frequently is in the neuralgias, tonics, nutritious diet, cod-liver oil, cream, etc., are indicated, also friction to the body by a coarse towel or rubbing with cold water. Among the medicinal remedies used extract of cannabis indica in $\frac{1}{8}$- to $\frac{1}{2}$-grain doses combined with quinin and continued for some time does most good. For the relief of the paroxysms a number of things may be tried: glonoin, guarana, citrate of caffein, aconitin, and antipyrin; the three last are the most efficacious and certain. Some persons are relieved by one remedy which gives no relief to another. A remedy which has been efficacious in one paroxysm may fail in the next. Morphin gives relief in some persons, but it is a dangerous remedy, as these persons are very apt to contract the habit of taking morphin in spite of their thinking they never will. Antipyrin requires to be given in 15-grain doses to adults. Relief is in some cases obtained by 5 or 10 grains of menthol in hot water. The newer analgesics offer the most fruitful class of remedies. If one is not serviceable, another may be tried with success. Intestinal antisepsis is a *sine qua non.*

VASOMOTOR SPASM AND PARALYSIS.

The blood-vessels are under the control of the vasomotor system of nerves. There is a vasomotor center, or, as it is sometimes called, monarchic vasomotor center in the medulla oblongata; each half of the body has its own center, stimulation of which causes contraction of all the arteries; paralysis causes an opposite dilatation. Under ordinary circumstances the center is in a state of moderate tonic excitement. It may be excited directly and reflexly, just as the cardiac and respiratory centers are. Besides this monarchic vasomotor center there are subordinate centers in the spinal cord; injury to the cord, therefore, causes dilatation of the blood-vessels; if the injury is high up in the cord, these subordinate vasomotor centers below the seat of injury, as soon as they have recovered from the shock, again control the blood-vessels and restore the tone of their muscular coat; they may, however, not do so completely. There are nerve-fibers whose stimulation causes the vasomotor center to produce a strong contraction of the arteries, and consequently a rise in the arterial blood pressure; these are called "pressor" fibers. There are also fibers whose stimulation reflexly diminishes the excitability of the vasomotor center; these are known as "depressor" nerves. Section of the vasomotor nerves, say in the cervical sympathetic, is followed by dilatation of the blood-vessels of the parts supplied by it; there are redness and increased temperature of the part, and there may be increased transudation through the vessels so as to give rise to a moderate edema.

This nervous mechanism may be injured or disordered in the medulla or in the spinal cord, the sympathetic ganglia, or in the afferent fibers. The vasomotor center in the medulla oblongata is influenced by the cerebrum, as is shown by sudden pallor in fright or blushing under some emotion. It is thought that it is a composite center, each part presiding over a particular vascular area. Poisons may excite the vasomotor nerves or paralyze them; irritations at a distance may reflexly cause the same effect.[1]

There are observed clinically a number of conditions which are very evidently due to disturbances of the vasomotor system. The exact cause of disturbance in a given case is very often difficult to determine. Every possible source of peripheral irritation should be investigated—the condition of the pelvic organs, the kidneys, liver, heart, stomach, etc. It may be the result of the presence of some morbid product in the blood. It occurs very much more frequently in women than in men, and in persons whose nutrition is defective or who live in damp, malarious, and unhealthy places. It occurs usually between twenty and forty years of age.

These disturbances are shown externally in three ways: (1) Intense pallor, temporary in duration, coming on suddenly, with lowering of the temperature and pain, confined to some local area; the fingers are the most frequently affected—one or more of them; for this reason it has been called "digiti mortui"; (2) it lasts a few minutes, then the pallor lessens, the warmth returns, and the natural appearance is restored; these paroxysms may recur many times in a day; this is the so-called angiospasm; (3) or the condition may be the reverse—there is an angioparalysis—a vasomotor paralysis: instead of pallor, there is a more or less sudden redness in localized spots, with tingling sensation; it gradually disappears after a few minutes; it may occur in one or both hands.

---

[1] For further information on this subject the student is referred to Landois' *Physiology* and Vulpian's *Leçons sur L'Appareil Vasomoteur*.

A number of painful vasomotor neuroses have been described. S. Weir Mitchell has related a painful burning condition of the feet, confined to the plantar surface mostly, and in patches; externally the parts look dusky red; it is brought on by long standing or walking; at first there may be a rise in temperature, with later some edema, swelling, coldness, and pallor in the part; he calls it "erythemomegalalgia." I have observed a somewhat similar painful condition of the feet in a young woman. It is most severe in the feet, but extends as high as the knees; both feet are affected; the pain is sharp and burning, and at times very severe; there is a very slight duskiness, but no swelling or edema; the temperature is not lowered. For the past twelve years she has suffered this painful condition during the summer months; she is perfectly free from it during the cold weather of autumn, winter, and spring. The pain is relieved by walking or standing; this is the reverse of Mitchell's case.

One is not infrequently consulted at the clinics and in private practice by sufferers from a painful condition of the hands and arms; it may come on at any time and is persistent; it is not accompanied by any changes in color or temperature; it is often worse at night, and appears to be influenced by the seasons and external temperature. In marked contrast with the condition of these women, who suffer only in the summer, is that of women who suffer only in the winter; in these cases the pain begins in the fingers of both hands on the approach of cold weather, with paroxysms of angiospasm which, on subsiding, are succeeded by paralytic dilatation, so that the hands become dark purple, swollen, and painful. Ulcerations occur, usually at the ends of the fingers. These ulcerations begin with severe pain in the end of a finger; then there is observed a small black spot—a small hemorrhage (note the similarity between this condition and the ecchymotic spots in locomotor ataxia)—which gradually changes into brown as the extravasated blood is altered, followed by ulceration with loss of tissue. The hands now become so painful, swollen, and purple that they cannot be used. On the approach of warm weather this condition improves, but there still remains evidence of the ulcerations. The skin of the fingers is glossy, the nails are slightly ridged, and the fingers are of a lower temperature than normal. Both hands are affected and all the toes to a less degree.

Raynaud's Disease.—A vessel spasm, which is still more marked, was first described by Raynaud in 1862, and has since been called Raynaud's disease, symmetric gangrene, or local asphyxia. It may begin in the same way as some of the conditions above mentioned, but this is not usual.

The disease may begin suddenly as a localized pallor. The hands are most frequently affected, then the feet; or it may be more general, when it affects the hands, feet, tip of the nose, and both ears. In these patients the pallor is usually accompanied with some pain of a tingling, burning character, but it is not severe. This is followed by a dusky appearance of the parts, which gradually deepens, finally becomes black and intensely cold; hence the name, symmetric gangrene, given to it. It is usually confined to the first phalanx of the fingers and toes, the tip of the nose, and the upper part of both ears; its extent varies in each finger. There is great danger of sloughing; the pulse may be feeble; the person looks distressed and anxious; he makes no complaint of discomfort. The manifestations of the vasomotor neuroses are numerous, but there is a marked general similarity among them.

Prognosis.—In some cases it is a most unfavorable condition so far as recovery is concerned; such was the result in Mitchell's cases. In others improvement occurs. The severe cases of symmetric gangrene appear to recover more frequently than any others.

Treatment.—This must be directed to discover any sources of peripheral irritation or the presence in the blood of abnormal products, etc.

A great deal has been done in the way of medication, often without satisfactory results. If the general health is poor, a building-up treatment should be adopted: tonics, quinin, arsenic, strychnin, with ample nutritious diet, residence in a healthy, dry locality, with out-of-door life and freedom from anxiety if that be possible. Galvanism to the spine has been used. In severe cases the vascular spasm may be relieved by belladonna, or chloral may be used to relieve the pain, provided the condition of the heart does not contraindicate its use. The parts should be kept warm with hot, dry flannel. If the pulse is feeble, stimulants or small doses of morphin and digitalis may be given.

UNILATERAL FACIAL ATROPHY.

This, as its name implies, is a gradual wasting of the muscular tissue on one side of the face.

Etiology.—It is more frequent in women than in men ; it occurs usually at a comparatively early age,—under thirty,—and in a few cases recorded, between ten and fifteen years of age. It appears to occur more frequently on the left side of the face.

It has followed the eruptive fevers, pertussis, and other diseases. In a few cases there has been pain in the superior maxillary region ; its etiology is not clear.

Symptoms.—It begins as a discoloration on the side of the face in spots, which spread ; these spots become yellowish and depressed ; the face gradually grows thinner on that side as the tissue gradually wastes ; the hair undergoes changes as well as the skin, and may become perfectly white. The cutaneous sensibility is usually not affected ; the skin becomes drawn, wrinkled, and hard, but it is not adherent to the bone. The electric reactions are, as a rule, said to be normal. The degree of atrophy varies very much. The bones have been found diminished in size.

Pathology.—Two theories are offered in explanation of this condition : one is that it depends upon a disorder of the vasomotor system ; the other, upon a disorder in the trophic fibers of the fifth nerve. It is difficult at present to say to which of these two theories the greater weight should be given. The disease may depend upon a disturbance in both, as the fifth nerve and sympathetic are so intimately associated. Cases have been recorded in which injury to the sympathetic has appeared to cause it.

Diagnosis.—It may be mistaken for an asymmetric face, but in this condition there is absence of the discoloration and atrophy.

Prognosis.—It is not dangerous to life.

Treatment.—Very little can be said on this subject.

SECTION VII.

DISEASES OF THE MIND—THE PSYCHOSES.

PSYCHIATRY is the study of the defects and modifications of the brain and brain action. Insanity is a word that defies definition in a medical sense. It is a vast conglomeration of conditions which are adjudged abnormal by psychiatry students of the times. The conditions of life are constantly modifying, and must have their influence on the mental life of the individual, so that many acts which were at one time considered normal may now be considered the result of an abnormal brain action, and, conversely, many current ideas of the present may at some future time be adjudged insane. From the jurist's point of view, the question of insanity means only the attitude of mind concerning certain legal conditions, such as property, life, responsibility, etc.

From a strictly pathologic standpoint all psychoses are the result of some form of disease or alteration in the human brain cortex. This process may or may not be a recoverable process. It may be extremely slight. It may be a defect of such extent as to render an individual an idiot.

As to the classification and the limitations of insanity, different view-points are found, and necessarily, since the study of normal mental life is in its infancy.

At least four steps in the psychic process should be considered in the study of the insanities: Feeling, perception, idea association, and acts. Modifications of feeling constitute the first steps in the psychic processes. Such modifications are present in many of the insanities. Hyperesthesias and anesthesias are very common in the mild psychosis, hysteria, and they constitute marked features in the neurasthenic insanities, in melancholia, and in certain delirious, maniacal states.

Changes in the feeling tone are particularly common in the melancholias. Hyperalgesia and hyperhedonia, hypalgesia and hyphedonia are frequent. Synesthesia, hallucinations, and illusions are all affections of feeling.

Modifications of perception and of related memory constitute the foundations of many delusional states.

It may be well, at the beginning of this section, to state briefly what are understood by a few of the terms which are in constant use in mental diseases. They are not definitions, but explanations. It is very difficult to define some of these terms to suit everybody. If we understand their application in mental diseases, that will suffice for the present.

Hallucinations of hearing, vision, taste, smell, and tact are quite common in the insane, and the frequency with which they are present is in the order in which they are here given.

Hallucinations are the perception of objects, sounds, tastes, smells, etc., when they do not really exist. If a person says he sees men outside and there are no men there, he has a hallucination of vision. If he says he hears a child shrieking when there is no child shrieking, he suffers a hallucination of hearing.

A person may have hallucinations and yet be sane; mentally he can correct the erroneous perception.

Illusion is the misinterpretation of the character of an object which is really perceived. If a man sees a piece of clothing hanging on a chair in his room and says it is a bear, or if, seeing a lamp-post, he says it is a man, he is suffering from an illusion.

Delusions are false ideas the result of disturbances in reasoning. If a man says he sees men outside his house with guns, when no men with guns are there, he has a hallucination of vision. If, now, he says, contrary to the evidence of others, that they are there, that they are coming in to shoot him, he has a delusion based upon his hallucination.

But he may also have these erroneous ideas without the hallucinations; he may, from a general disturbance in his reasoning faculties and vague feelings of distress, say that he has committed some crime which he is unable to give any evidence of, and is to be hanged to-morrow; he suffers from a delusion.

CHAPTER I.

CONSTITUTIONAL PSYCHOSES.

HYSTERIA.

THIS is a morbid state of the nervous system in which the clinical manifestations present the most wonderful variety, and in a remarkable manner simulate organic disease; there is often increased physical irritability. It is often manifested by neuralgic pains, hyperesthesias, hallucinations, and convulsive and paralytic phenomena. It may be regarded as a psychosis.

Etiology.—Heredity plays a most important part in its production. There may be a direct transmission of hysteria from the parent to the child, or there may be other nervous manifestations in the members of the family and its branches, such as epilepsy, chorea, neuralgia, insanity in some of its phases, or some other nervous disorder. It occurs more frequently in women, but it is much more common in men than is ordinarily believed; it occurs in boys and girls at a tender age or about the time of puberty. Briquet found that one-eighth of his cases were in children under ten years of age. Anything which lowers the general tone of the nervous system may give rise to it in these oversensitive, predisposed persons. Hemorrhages, severe illness, poor food, anemia, overwork in occupations which are not congenial, anxiety, fright, jealousy, disappointments of all kinds, make a profound impression; so does an education which fosters and stimulates this inherited instability. The enforced social restrictions of women, which they often inflict upon their young children, with lack of proper exercise for physical development and an artificial and premature education and habits heighten this predisposition. Accidents are a frequent cause of the first appearance of the condition, as has been clearly pointed out by Charcot. The disease may, at times, occur in young girls who have witnessed attacks in others.

Symptoms.—In the understanding of the clinical picture of hysteria it is essential to bear in mind that there are two classes of phenomena. These have been termed the *mental stigmata* and the *mental accidents*. The stigmata are anesthesias, amnesias, abulias, motor disturbances, and modifications of character. These are the cardinal symptom-groups that characterize the mental state of the hysteric.

In addition any or all of the mental accidents may be noted. These are, for the most part, suggestibility and subconscious acting, fixed ideas, attacks of ecstasy, automatism, tics, etc., somnambulism and deliriums. These constitute important corroborative evidence of the hysterical state. They are not found in all hysterics, but are very common.

Hysterical persons often complain of some of the symptoms found in neurasthenia—neuralgic pains in various parts of the body and hyperesthetic areas about the abdomen, chest, or back. A frequent location of them is in the neighborhood of the ovary, mammary gland, etc. There may be anesthetic patches in various parts of the body, or there may be complete hemianesthesia, which is associated with anesthesia of the mucous membranes. The special senses on that side are involved—sight, taste, and hearing. There may be restriction of the visual field for color. The degree and completeness with which these manifestations present themselves vary.

There may be irritations of the bladder and urethra. Patients often complain of pain in the joints, which may be mistaken for joint disease, especially if there happens to be some swelling. Sir Benjamin Brodie called attention to the frequency of these hysterical joint troubles.

In some cases of hysteria the senses are exceedingly acute. Persons notice odors which are not perceptible to others; they are often made very sick by odors which have no influence on normal individuals. On the other hand, they may have a liking for odors and substances disagreeable to other persons; these perverted senses are well shown in an abnormal taste, in eating soap, slate pencils, small chalky or soft stones, etc. The hysterical manifestations in some are simply an exaggeration of their emotional state; they laugh and cry without cause. When there is a more or less profound attack, there are likely to be present a number of hysterical manifestations. In the anesthesia which occurs in these cases, as a rule, the sensibility to pain is alone overcome; the other forms of sensibility are normal; occasionally tactile sensibility is disturbed, and the muscular sense may in some cases be abolished. The anesthesia may affect the mucous membranes of mouth, pharynx, and nose, and in consequence the reflexes of the parts are abolished. The secretions may be diminished or arrested.

Spasmodic convulsions and paralytic phenomena may occur. The spasmodic attack may be of great variety: it may be rhythmic; it may simulate the trembling of organic disease; be confined to one member or involve the entire half of the body and be hemiplegic in type; it may be coarse, as in disseminated sclerosis; or fine tremor, as in paralysis agitans; or may simulate the prehemiplegic and posthemiplegic trembling of organic disease; it may occur in any muscle or group of muscles in the body; it may manifest itself as contracture, which may be intermittent or last continuously for months and years. Professor Charcot has pointed out the permanency of these conditions and the obstinacy to treatment which often characterize them. These contractures may be confined to the masseter and other muscles in their neighborhood, causing trismus. Spasms of the glottis may take place, giving rise to severe dyspnea; or of the pharynx, causing difficulty in swallowing. Globus hystericus is rather a constant symptom, but not so frequent as it is often thought to be. Persistent and severe vomiting often occurs, but the nutrition rarely suffers materially from these attacks. Retention of urine is frequent, owing to spasm of the sphincter, and the catheter may have to be used for months.

Paralysis occurs in these cases; it is variable in distribution, and may come on suddenly after a convulsive attack or without it; it may be flaccid or associated with contracture; it may come on slowly; it may be confined to one limb or be hemiplegic in type. These paralytic phenomena may disappear in a short time, to occur again in the same parts or in some other parts after the lapse of a few months.

These persons are impressionable—easily affected by pleasurable or painful impressions, and there is often a morbid craving for sympathy and attention. This morbid state may present itself in persons who had previously not shown the least sign of nervous impressionability. They may show a tendency to moral perversions: lie, steal, quarrel with and intrigue against their own family. They often form attachments to, and dislikes for, persons without obvious reason, and as frequently change them. They often manifest an aversion to certain creatures, such as frogs, spiders, mice, cats, etc. Others show a desire to deceive, often for deception's sake; or to make themselves the objects of curiosity and wonder. To this end they drink urine and eat excrement, which they vomit up, or they pretend that urine passes through the navel or other part of the body; or they may inflict injuries upon themselves which they pretend were inflicted in some other way; or they may pretend that they had attempted suicide. They would have us believe they fast.

Others are painfully depressed; they are sad, have forebodings, or are compelled to the performance of certain acts. On this border-line we approach the hysterical insanities, on the one hand, and the imperative conceptions and neurasthenics, on the other. A record of these morbid manifestations in hysteria would fill a long chapter.

Convulsive Seizures.—Hystero-epileptic attacks in their greatest severity are not apparently of so frequent occurrence here as in Europe, especially in France; but this may be due to the large hospitals for chronic cases where patients are massed together. These convulsive seizures often are preceded by a feeling of general discomfort or of hallucinations of vision and hearing, such as the cries and sight of wild animals. They are usually sudden, but they may be preceded by an "aura," globus hystericus, singing in the ear, or haziness in the visual field. Respiration is spasmodic; consciousness is obscured; the convulsion may be similar to that of epilepsy of moderate severity. In some cases the body is thrown into all sorts of contortions and attitudes. An extreme opisthotonos may be present, the body being bent backward, resting on the head and heels. Or there may be various contortions of the body, which are fixedly maintained for some time. The legs and arms are thrown about. The persons make gestures and noises. They sometimes have religious ideas, which have an influence over the attitudes assumed during the convulsion; or they have ideas of demoniacal possession, which give rise to hideous facial expressions.

One phase of this condition deserves mention here, and it is the association of hysterical symptoms with organic disease. This association often leads to great difficulty in diagnosis even by experienced clinicians.

Prognosis.—From the milder forms, recovery is the rule. In the graver manifestations of the disease, and when there is a strong neuropathic tendency, there is every probability that the person will pass from one hysterical manifestation to another.

Treatment.—In those cases—and they are not uncommon—in which there is deterioration of the physical health, tonics and nutritious diet should be given. Hydrotherapy is of benefit, not alone by improving the nutrition, but also by its influence on the mental state. A large number of drugs have been recommended, but they are all exceedingly uncertain in their action, apparently giving a result at one time and entirely failing in the next. The convulsive attacks may at times be stopped by the cold douche to the spine or by a hypodermic injection of $\frac{1}{20}$ of a grain of apomorphin or $\frac{1}{100}$ of a grain of hyoscin hydrobromate. Isolation from the family circle is of the utmost importance in the treatment of these cases. Every effort should be made to discover the emotional disturbance, the psychic shock, which has produced the hysterical attack. It is sometimes very difficult to obtain this information, as it may be known only to the patient, and he will not often reveal it. It has been suggested that this information can be obtained by hypnotizing the person. There is no disease the treatment of which it is more difficult to describe. Much depends upon the ingenuity and thoughtfulness of the physician in devising expedients for influencing the mental state of the patient. Suggestion therapy gives by far the best results, but the great difficulty is that good results are rarely permanent.

Bibliography.—Charcot, Leçons sur les Maladies du Système Nerveux, tome 3. Janet, Mental State of Hystericals, Putnams, 1902.

CONSTITUTIONAL PSYCHOPATHY.

This term is applied to those persons who come into the world with deficient or peculiar mental stuff in their psychological make-up, who have inherited from their parents a personality which is more or less defective. Under this head neurasthenia and hysteria must also be placed. Constitutional psychopathy has many different sides and includes many geniuses, some criminals, most of the "cranks," and some who are really insane. The constitutional psychopath cannot be said to have acquired a psychosis, but rather to have been born with one, and these persons live out their lives in the borderland between sanity and insanity.

Intellectually, these persons are usually very normal and at times are exceedingly clever, even to the point of genius, and their psychopathic tendencies are generally overlooked by their friends as little oddities. It is only when the psychopathic traits become so prominent as to make the person's conduct improper or conspicuous that the question of his sanity arises. The commonest manifestations of psychopathic tendencies are impulsive ideas, ideas of indecision (folie de doute), morbid fears, and sexual perversions.

Patients with impulsive ideas have uncontrollable or almost uncontrollable desires to do certain things they know are wrong. They realize that the idea is absurd and wrong, and know that the results will be disastrous, yet they feel impelled to do it. They are seized with a desire to destroy other people's property, to burn houses, to murder those they are fond of, to commit suicide by shooting, poisoning, or jumping from great heights, or to commit rape, etc. The unfortunate individuals realize the horror of their desires and endeavor to overcome them, and, being unable, commit their crime or else break down, and are thrown into a state of distress and anxiety in which they are helpless and seek aid.

When the patients are beset with ideas of indecision they are utterly unable to make up their minds. Even when the smallest thing is involved they are unwilling to make a decision for fear they will do the wrong thing. The fear of *calamity* is always with them, and when at last a decision is forced on them they worry, and are fearful that they have done the wrong thing and must bear the consequences. This indecision is seen in all their actions, whether it be choosing a pair of shoes or contemplating matrimony.

Morbid fears are very common manifestations of constitutional psychopathy, and often occurs as the only psychopathic trait of an otherwise normal individual. The fear of animals, especially cats, is rather frequent. The persons recognize the absurdity of the fear, and may even speak of it in a joking fashion, yet, when in the presence of the object of their obsession, they are powerless to resist the fear which overcomes them. Quaking, pale, covered with perspiration and trembling with fear, they must run away from the object they fear. Once away, they return to their normal state. Other patients have other fears: of going into open places or even across the street (agrophobia); of tunnels and other dark places; of dirt, of railroad cars, of crossing rivers, of knives, and of objects made of metal.

Sexual perversions are anomalies in the sexual desire, and are the most frequently seen of the psychopathic tendencies, as they are the ones which most frequently get these patients into trouble. The commonest ones are: *Homosexuality* (sexual desire directed toward the same sex), manifested by exclusive desire for companionship with the same sex, mutual masturbation, sodomy, etc.; *Sadism* (gratification of the sexual desire by inflicting pain on the object of affection); *Masochism* (gratification of the sexual desire by being physically hurt by the object of affection); and *Perversions* of the sexual act with the opposite sex (cunnilinguism, etc.). Often these patients show nothing abnormal in their appearance, but those with homosexual tendencies may have characteristics of the opposite sex. The men are effeminate, with high-pitched voices and absence of beard, and are fond of things which interest women. The women are masculine in appearance, heavy of build, and deep of voice, and show a preference for manly things.

CHAPTER II.

GENERAL NEUROPSYCHOSES.

THERE are psychoses developed on a markedly neurotic substratum, and are characterized by functional nervous disturbances. The group, as outlined by Kraepelin, contains the epileptic, hysterical, and traumatic insane states.

EPILEPTIC PSYCHOSIS.

The epileptic state has already been described. Insanity may follow the epileptic convulsion—postepileptic insanity. It may precede the convulsive seizure. It may take the place of the convulsive seizure, or it may terminate in dementia.

After one or more epileptic seizures there may be a sleep of short duration, which may be followed by a state of light stupor during which, or following it, there is a state of fright and terror, with disturbance of consciousness more or less complete. The stupor may be prolonged for days; it may be deep, or only a confused dazed state in which the patients mutter to themselves, repeat words, move about from side to side in a restless manner. They may be constantly asking questions and making complaints or demands. They have difficulty in speaking. Speech is indistinct and hesitating; their movements may be slow, awkward, and trembling. Consciousness is profoundly disturbed. After the attack has subsided they may indistinctly and in a fragmentary manner recall certain things which have occurred; or there may be a state of anxiety, irritability, and excitement (postepileptic delirium) the result of hallucinations of a terrifying nature. They are thrown into a state of wild excitement and fury, in which they break objects; injure themselves and others; the face is congested, eyes and conjunctiva injected, facial expression that of terror and fury, eyes more or less fixed and wild; arteries throb. At the end of a few hours or a few days they quiet down gradually and sleep, after which there is a light state of stupor or confusion. They complain of headache, and of feeling bad and tired; during the excitement they neither eat nor drink; now they begin to take food. The hallucinations are terrifying: they see God, the heavens opening, angels and devils, hear music or terrifying noises. The violence is sudden and furious, and directed against persons and objects around them with indifference; a parent kills his child by suddenly dashing it against the wall (a case which came under my personal observation). They may mutilate themselves. In other cases the maniacal seizure may precede the convulsion; they are irritable, strange, restless, asking innumerable questions, and making demands; become more and more agitated; this is followed by a convulsive seizure, after which they may pass into a sleep, followed by a confused state and recovery of their former selves, or, after the convulsion, there may be the wild excited state, as in cases of postepileptic delirium. Or the convulsive seizure may be replaced by a maniacal attack similar to the postepileptic delirium; they may have all the terrifying hallucinations or not; they sing, shout, break up everything about them.

There may be maniacal attacks which last weeks and months with marked disturbances of consciousness, illusions, and hallucinations of a distressing character, marked ill temper, fault-finding, with religious ideas, a disposition to acts of violence, and a tendency to end in dementia.

There are also seizures, more or less sudden, and these are not succeeded by convulsion, in which the person is seized with dread, terrifying ideas, a dazed state of consciousness, with impulses to suicide or acts of violence to others, and there is a disposition to wander away from his residence; it is of short duration—a few days.

There are also seizures, very much like petit mal, in which there are sudden and temporary confusion, disturbed consciousness during which they perform apparently voluntary motor acts (automatic acts), such as attempts at suicide or homicide, thefts, setting fire to places, rape, etc. There is complete amnesia. They are of short duration.

During the convulsive seizures there are elevation of temperature and increased pulse-rate.

Epileptics are often profoundly egotistic; they think only of themselves, and observe minutely all the acts of their vegetative life; they are indifferent to those about them; they are irritable, easily offended, and the least opposition to their wishes gives rise to vague ideas of persecution. On the other hand, they are often easily made sociable and pleased by small attentions and acts of kindness or a few kindly words. They are frequently excessively religious, speak only of God and religion, sing hymns, and read the Bible. This excessive religious feeling may precede a maniacal attack. They are often defiant, quarrelsome, and fault-finding. In the majority of these cases they gradually pass into a state of dementia.

Treatment.—These epileptic insanities are best treated in asylums. In the maniacal attacks it is necessary to isolate them; if the maniacal excitement is prolonged, so as to cause exhaustion, narcotics must be given—chloral is the best. The treatment otherwise is the same as epilepsy, but usually less successful. In the maniacal seizures which replace the convulsive attacks the best results are sometimes derived from the use of full doses of bromid of sodium or potassium.

HYSTERICAL PSYCHOSIS.

The hysterical temperament is its foundation; it is very variable. There is an extreme change of state; it is much influenced by disturbed conditions of the sexual apparatus, feebleness, physical and mental; the reflexes are overactive; they are thrown into convulsive states with great ease; they are emotional and imaginative; impressionable; there are often sudden intellectual confusion and incoherent ideas; they are fond of being eccentric and attracting attention; their behavior is such as they think most calculated to make them interesting. They are egotistic; they neglect their own occupations to engage in useless benevolent work. Others are disagreeable, quarrel with their friends, and abuse their families so that they cannot live at home. They are subject to intense hallucinations of a fanciful character. They have either excessively strong sexual desires or the reverse, and are sometimes given to self-abuse. They exaggerate their pains, and accuse those about them of unkindness; they pretend resignation to their state. They are usually unfavorable cases for recovery.

The traumatic neuroses have already been considered.

CHAPTER III.

INTOXICATION PSYCHOSES.

These would include the deliriums of many of the acute intoxications, such as atropin, cannabis indica, morphin, lead-poisoning, alcoholic poisoning, and the thyroid insanities, as seen in myxedema and cretinism. The infective-exhaustive psychoses may also be considered here.

ALCOHOLIC PSYCHOSES.

Alcohol is by far the most common toxic agent we have to deal with, and it may cause many different types of mental disturbance. The ones we may best consider here are: Alcoholic hallucinosis (delirium tremens), Korsakow's psychosis, alcoholic paranoia, and chronic alcoholic states.

Acute Alcoholic Hallucinosis (Delirium Tremens).—This condition comes on after a prolonged debauch, especially when the individual has eaten little and has substituted alcoholic beverages for his food. The patient becomes weak and trembles all over, and soon active hallucinations of sight set in, which are generally of a horrible character. Most frequently the hallucinations are of animals, reptiles, and insects, which try to harm the patient and throw him into a state of excitement and fear. He sees dogs, cats, lions, and snakes of vivid and fantastic coloring, of which he is afraid and which he tries to fight off. Illusions are prominent, and the patient will mistake a chair for a horse or a bed for a polar-bear. Hallucinations of hearing occasionally appear. Voices threaten and taunt the patient, calling him vile names and making indecent and profane remarks about him. Later a noisy, excited delirium may develop, in which the patient shouts and calls, sometimes in fear, sometimes in play. In many of the cases the delirium subsides, leaving the patient in a weakened state, with little or no memory for the events of the period of his excitement. Not infrequently these patients die from an intercurrent pneumonia or other infection, from cerebral edema, or from exhaustion.

Korsakow's Psychosis.—This is a mental condition which occurs with multiple neuritis and most often with alcoholic neuritis, although it may occur with polyneuritis of other etiology. The main features are: disorders of attention and of memory, fabrications, and polyneuritis. The onset is usually rather sudden, at times with delirious excitement, unrest, anxiety, and often hallucinations of sight. The orientation is lost, and there is complete inability to fix things in the memory, for the remembrance fades in a few minutes. The patient fills in the gaps of memory with senseless fabrications, which are much influenced by questioning. Thus bedridden patients tell lurid tales of their activities of the day before; of the walks they took, the tasks they performed, the people they saw, and, from minute to minute, they tell different stories without noticing the discrepancies. All ideas of time are lost, and events of the previous hour are as completely forgotten as those of years before. The grasp on school knowledge, however, shows little or no change. The mood may be anxious, indifferent, sullen, or childishly cheerful.

The course, if not fatal, is usually slow, with recovery in five to nine months, often leaving residuals of weakness of memory, and at times more or less dementia, with persistent falsifications of memory.

Alcoholic Paranoia (see Paranoic Conditions).

Chronic Alcoholic States.—The manifestations of chronic alcoholism are many and include numerous conditions, from the mild irritability and slight judgment defect of the ordinary chronic alcoholic to severe states of dementia. The latter, at times, resemble general paresis rather closely, and at others senile psychosis. The so-called dipsomaniacs, who periodically feel impelled to plunge into the depths of alcoholic intoxication and, after a debauch of several days or months, suddenly emerge to take up their normal life of abstinence, are in many cases sufferers from either epilepsy or manic-depressive insanity, and their alcoholism is merely a symptom of their disease.

Treatment.—Acute excited states, especially those with terrifying hallucinations, require sedative treatment. Hot packs and the continuous hot bath are the best sedatives; but if drugs are necessary to quiet the patient or produce sleep, the bromids, chloral, paraldehyd, and hyoscin are the most useful. In Korsakow's psychosis, rest in bed with all the food the patient can take, as well as active eliminative treatment; hot packs and baths, saline cathartics, and saline diuretics. Alcoholic paranoia and dementia require institutional care.

INFECTIVE-EXHAUSTIVE PSYCHOSES.

Under this heading are grouped the confused, delirious states occurring in patients who have suffered severe attacks of infectious diseases—typhoid, pneumonia, measles, scarlet fever, and septic infections; or who have been through some severe exhausting experience, such as child-birth, severe hemorrhage, etc. Heredity is an important factor, for it is the poorly balanced nervous system which succumbs to these misfortunes. Women are more frequently affected than men.

The mental picture is one of confusion, with loss of perception, orientation, and capacity for connected thought. The condition is usually one of delirious excitement, often with more or less anxiety. Hallucinations and illusions are prominent in all fields. The mood is very superficial, changing rapidly from joy to sadness. The stream of thought is disconnected, and the steady flow of talk shows flight of ideas, distractability, senseless alliterations, rhyming, new-coined words (neologisms), and, at times, paraphasia. With this there is marked motor restlessness; getting out of bed, undressing, dancing, clapping hands, and grimacing. Generally they refuse all food.

Duration: A few days to two weeks, and, if death does not intervene, the patient suddenly recovers, often after a long sleep. Orientation returns, the patient is quiet and orderly, and usually exhausted after his excitement.

Treatment.—Absolute rest and, whenever possible, the continuous hot bath. Forced feeding, with the stomach-tube if necessary. If sedatives are required, bromids, paraldehyds, or, in extreme cases, hyoscin, but usually the hot bath is sufficient. When recovery has begun, give plenty of food, open-air-life, and tonic treatment.

CHAPTER IV.

DEGENERATIVE PSYCHOSES.

THE degenerative psychoses are here understood as examples of various types of mental breakdown leading to a mild or a profound state of dementia. Such are the result of a large variety of causes, but a number are of sufficiently definite course to warrant their special place in nosology. Following acute meningitis in the tuberculous there may result a *dementia meningitica*. *Alcoholic dementia* and *epileptic dementia* have been considered. Following cerebral hemorrhages, cerebral thrombosis, or embolism, dementia may result. In many young persons the developmental period of puberty proves disastrous and *dementia præcox* develops. Finally *dementia paralytica* or general paresis and *senile dementia* complete the survey of these simple degenerative psychoses.

Of these various forms of dementia, only three will here be considered—*dementia præcox*, *dementia paralytica*, and *senile psychosis.*

DEMENTIA PRAECOX.

"Stranded on the rock of puberty" is the characteristic phrase used by French writers in speaking of this interesting entity that has been recognized with reasonable definiteness among many of its allies only since 1888 by Clouston, A. Pick, 1891, and by Kahlbaum and by Kraepelin.[1]

Dementia præcox is a defect psychosis that develops during puberty or young manhood, and is characterized by a progressive deterioration in intelligence and by characteristic apathy and increasing stupidity.

Etiology.—Puberty, or the development of the sexual life, seems to play the most important rôle. It occurs as late as the twenty-fifth year, but is rare initially after that age. Men seem to be more often affected than women. Hereditary influences seem to play an important part in the history. Ziehen claims that 80 per cent. show some form of family history.

Symptoms.—The onset is usually slow and gradual, so that the patient's relatives often do not notice that a change has taken place in him till the disease is well advanced. The deterioration is always most marked in the emotional field, and the patients become increasingly indifferent and apathetic to joy and sadness alike. At times they are jolly, but more frequently they present a picture of rather uniform but shallow sadness. Orientation is usually intact, but may be influenced by delusions. Attention and perception are well preserved. Memory and intellect show little change till late in the disease, although many patients complain of not being able to think (thought block). Judgment is markedly affected, especially in dealing with new problems. Hallucinations are very common, most often of hearing, but occasionally of sight and of feeling, such as sensations of electric currents, of contact, or of outside influence. Delusions at times, usually of persecution, of sin, or of grandeur. These are usually absurd and changing in character, and the patient reacts indifferently to them. Among the special symptoms are negativism, stereotyped attitudes, and automatism. The tendon reflexes are generally increased. Dementia præcox cases are divided into three fairly well-defined groups—the *hebephrenic*, the *catatonic*, and the *paranoic*.

The *hebephrenic* form begins about the age of puberty and is characterized by great negativism, vivid hallucinations, mumbling, peculiar mannerisms, and a tendency to careless laughter. The *catatonic* form has catatonia as its main feature. This may vary from simple muscular resistance to catatonic stupor, in which the patient is unable to change the attitude he is in, and holds unnatural positions for long periods. Besides this, wild and fantastic ideas, religious or persecutory in nature, are prominent. The *paranoic* form presents the formation of delusions and hallucinations, with rapidly developing dementia. The delusions, generally of persecution or of grandeur, are fantastic, and usually dependent on the hallucinations. At first the delusions are more or less connected, but later become confused in the developing dementia. Feelings of physical influence are very characteristic—hypnotism, electricity, magnetism, etc.

Prognosis.—Over 75 per cent. of the cases go on to a state of deep dementia. In some cases the dementia is more moderate, and the patients are able to do a little work. In about 10 per cent. there is partial recovery, so that the patient is capable of limited activity.

Treatment.—This is largely custodial, but something may be done by tonic treatment. Baths, electricity, light, open air, and sunshine on a ranch with an attendant may help some. Others are benefited by a long sea-voyage.

Bibliography.—Kraepelin, Ziehen, Lehrbuch. Deny and Roy, Le demence precoce, 1902.

GENERAL PARALYSIS OF THE INSANE (Progressive Paresis; Dementia Paralytica).

This is a chronic disease of the brain characterized by marked mental enfeeblement, with grandiose, hypochondriacal, or melancholic delirium.

Etiology.—The most important etiological, and probably the causative, factor is syphilis. As secondary causes, excesses in alcohol, venery, mental and physical strain, are prominent. Men are more often affected than women. The disease usually starts between 30 and 50 years of age, but cases have been reported in children (congenital syphilitics) and in old people.

Symptoms.—As prodromal symptoms, found in many cases, are marked changes in the disposition and character; they become irritable and fault-finding, especially at home, quarrel with their wives and children without cause; neglect their work; make mistakes in their business; are careless; formerly of exemplary character, they now begin to drink freely, are overactive, but in a careless, disorderly manner, going from one subject to the other, without the least effort to accomplish anything they undertake; they may associate with fast women, upon whom they spend large sums of money. They complain of fulness and pain in the head, vertigo, and insomnia. After this prodromal stage the mood may be extravagant, hypochondriacal, or melancholic; or there may be a passive, self-satisfied state. There may be a sudden or gradual development of grandiose ideas; they become very active, sanguine to the extreme about their business prospects, anticipate the making of large sums of money; talk incessantly of business enterprises, one after the other, and usually of immense extent, requiring for their development very large sums of money. The absurdity of these plans and the bringing in of collateral plans of the most ridiculous kind are evidence of their mental weakness; the weakened memory is marked by their forgetting the detail of their plan as first stated. Or they are suddenly plunged into a maniacal state, talking incessantly, passing from one extravagant statement to another without any connection; are in constant physical activity; there may be a decided mental confusion; they may tear and break things about them. Others are moderately quiet and happy in their ideas of wealth; if they are unrestrained, they spend large sums of money, buy horses and carriages, gloves, umbrellas in large numbers, or spend their money on useless trifles; or in their activity they may paint their houses inside with whitewash or in the most fantastic colors. They may pick up pieces of coal, wood, stones, and rubbish, say they are diamonds, gold, or valuable articles, and put them away carefully (Fig. 48).

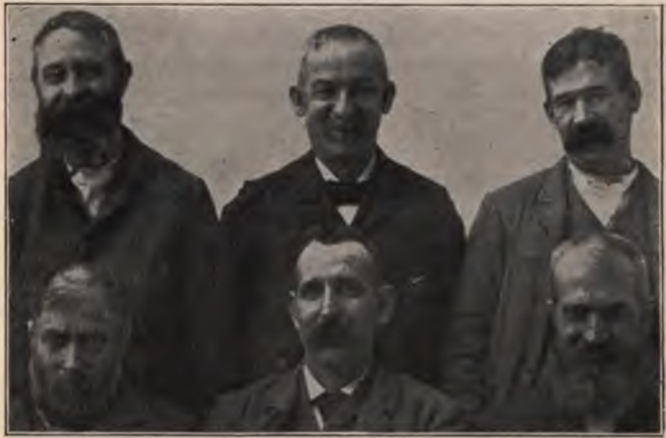

FIG. 48.—A group of paretics. Taken to show exalted and melancholic phase (Dr. Atwood).

The sexual desire is often much exaggerated at this period. They wander from one extravagant idea and act to another; their variety is innumerable. Instead of the ambitious delirium there may be hypochondriacal or melancholic ideas; they are depressed, say their teeth are lost, something is wrong with their eyes, arms, or mouth; complain of pain in various parts of the body; show what they take to be changes in their skin and hands; are very emotional; cry without cause. They are often conscious of their condition. There may also be a mild delirium of persecution; they think people are following or watching them. This delirium may continue until dementia is extreme, or it may be replaced by extravagant ideas, or there may be mild ambitious ideas associated with it. Another form is the delirium of satisfaction; the person feels perfectly well; never was better in his life; is satisfied and contented even with the plainest food and housing; is quiet, gives expression to no ideas or wants. The defect in memory increases; they lose themselves, forget the ordinary occurrences in their daily life.

The physical symptoms which often appear early are difficulty in speech—it is thick and hesitating; they are unable to pronounce words distinctly; this is much greater if the person is agitated or angry; the lips and facial muscles tremble. The pupils are contracted or irregular, or one is larger than the other; their reaction to light may be diminished or lost. There may occur at any time during the course of the disease epileptiform and apoplectiform seizures. The epileptiform attacks may begin with localized twitchings of the muscles of the face or one hand, and gradually extend into a generalized convulsion; with all the features of epilepsy—during which the temperature runs very high. There may be a series of these convulsions similar to those found in status epilepticus; during these attacks the person may die, or the convulsions may cease, leaving him very stupid, and perhaps paralyzed on one side. The stupor and paralysis usually pass away; the person is always worse after these attacks; it can be observed that he is weaker and more feeble mentally; it is possible to have a lasting hemiplegia in these cases. Apoplectiform seizures occur in which there are no convulsions; they suddenly become rigid, stupid, pass urine involuntarily; in a short time they recover, but are stupid and dull, with more or less marked hemiplegia, which gradually disappears. The tendon-reflex may be present, absent, exaggerated, or unequal. The blood-serum almost invariably gives a positive Wassermann reaction. The cerebrospinal fluid shows an increase of lymphocytes (20–100 per c.mm.) and a few plasma cells. The globulin content may or may not be increased. The Wassermann reaction in the cerebrospinal fluid is almost invariably positive.

As the disease progresses they become more and more feeble, mentally and physically. The urine may dribble away. They eat voraciously whatever is set before them; taste is evidently very much diminished; they are at this stage in danger of choking themselves by trying to swallow too large pieces of food. They may grow very stout or exceptionally thin and cadaveric. Trophic disorders appear. The bones may undergo changes similar to those found in locomotor ataxia. Ulcerations of the skin and paralytic edema are present. If they are not cut off by convulsions, the mental enfeeblement becomes extreme; physically, they become too feeble to move about, and are consequently confined to bed; diarrhea, extensive bed-sores, and ulcerations of the soft parts of the heel and toes occur, and they die of exhaustion or diarrhea.

At any time during the early course of the disease there may be an entire subsidence of the delirium and disappearance of the physical symptoms; the person is apparently recovered; he no longer expresses his extravagant ideas, behaves rationally, and returns to his business, which, if comparatively simple, he may perform without difficulty. This subsidence of the symptoms is known as a "remission"; it may last from a few months to one year, when the person again presents all the physical and mental symptoms as at the beginning, and the disease runs its course to death.

General paralysis occurs in women, but it is much less frequent; in most cases it occurs between thirty and forty-five years of age; it has evidently the same causes as in men. The marked delirium of extravagance is seen among women, but very much less frequently than in men, and their ideas are of diamonds, dresses, their personal appearance, or the number of their children; as a rule, the delirium is of a quieter kind: they are satisfied; occasionally they may express an extravagant idea, and it is then usually in regard to dress or personal appearance; a woman suddenly puts out her foot and asks if it is not a pretty foot, or she picks up the skirt of her dress and asks if her underskirt is not beautiful. They may have the hypochondriacal and melancholic ideas. The disease comes on and progresses more slowly than it does in men. They may have all the other symptoms.

Prognosis.—This is unfavorable; the duration varies: they may live two, three, or four years, exceptionally longer.

Pathologic Anatomy.—Marked thickening of the pia mater, with whitish streaks, especially along the vessels; the pia is adherent in places to the cortex; the vessels are tortuous and distended; the changes are most marked over the frontal lobes and the convolutions about the fissure of Rolando; there is more or less atrophy of the convolutions, with spots in which the atrophy is more extensive; here there may be found considerable edema of the pia mater. The occipital lobes are usually healthy. The ventricles may be distended with fluid; the ependyma is granular.

Histologically, the vessels are tortuous and enlarged. With aneurysmal dilatations, the nuclei in their walls are increased, especially at their bifurcations, with fatty and colloid degenerations of their walls. The vascular lymph-spaces contain many lymphocytes and plasma-cells, and occasionally a mast-cell. There is marked evidence of hyperemia in the deep layers of the cortex and basal ganglia. The nerve-fibers have disappeared, and there is an increase in the neuroglia, with a profusion of spider-cells. The nerve-cells have undergone all degrees of fatty and pigmentary degeneration. Various grades of chromatolysis are constant. In the spinal cord there is more or less extensive change: sclerosis in the posterior columns; degeneration in the lateral columns, or more diffused lesions. This condition is spoken of as chronic diffuse meningo-encephalitis.

Treatment.—There is no treatment which cures this disease. The excitement is lessened by the use of bromid of sodium or potassium. In those cases where there is a clear history of syphilis, iodid of potassium in increasing doses, as is given in syphilitic nervous diseases, produces no effect whatever in this disease. Quite a large proportion of these cases must be removed to asylums; others are quiet and are kept at home.

SENILE PSYCHOSIS.

This is the result of degenerative changes in the brain, atheroma, endarteritis, periárteritis, general disturbances in nutrition, localized atrophies, together with the changes in the other organs found in senility. It may begin at any time after fifty years of age. It begins usually with irritability, which is an expression of defective nutrition of the brain; dements become apathetic, suffer general malaise, with vertigo and insomnia. The memory becomes defective for recent events, while they can recall past events. As the condition progresses, they become obstinate, unreasonable, and often suspicious. They may think their house will be broken into by thieves; this makes them very anxious; they take extra precautions in fastening up the windows, and sometimes at an unusually early hour of the evening, or they may believe their goods are being carried away and that their families will starve. They become restless at night, get up and wander about at times looking for thieves; in other instances they can give no reason for their wanderings.

As the condition progresses they eat freely, forgetting soon afterward that they have had their meal, and calling for another; or they may go to alcoholic excesses in the same way, forgetting that they have taken a drink and take another. In spite of this consumption of food they grow thin and haggard, the face pale, and the skin wrinkled and shriveled. They lose all sense of propriety, make obscene and coarse remarks, expose their persons, or go about partly dressed, when they had in health been particular as to behavior and dress; or they may make foolish marriages or assaults upon girls. The general mental state in these persons is that of depression, but there may be exaltation to a moderate degree. As the disease progresses the defect in memory becomes great; they get lost in their wanderings, forget their house, and the names and number of their children. They may suffer apoplectiform seizures, grow more and more feeble; the disposition to wander away may become very troublesome; it is sometimes done with the idea that they are not in their own house; they may suffer from cystitis, and are liable to have pneumonia. They gradually fail, grow weaker mentally and physically, develop bed-sores, perhaps diarrhea, and die; often Cheyne-Stokes respiration appears at the last. Old people sometimes have attacks of ordinary insanity, such as melancholia, mania, etc.; then the mental changes are those found in those states, and are not included under senile dementia. The dementia after cerebral hemorrhage, tumor, and other gross brain disease is also not included under this head.

The duration of this condition varies very much: it may be rapid, especially if complications arise; otherwise it lasts from about one to three years.

Treatment can only be palliative. They have to be cared for like children. Some hypnotic may be given them at night, such as the bromids, trional, veronal, etc.

CHAPTER V.

PARANOIC CONDITIONS.

THIS term covers a group of cases of intellectual anomalies which cannot be considered as diseased states, but, more properly, changes of personality and temperament. The basis of these conditions is a series of preconceived false ideas or delusions, which the patient elaborates upon and systematizes with clear logic until they obscure the patient's judgment and dominate his conduct. The form the condition assumes depends on the nature of the delusions, and many forms of paranoia have been described, such as the religious, the querulent, the persecutory, the erotic, the ambitious, etc.

In true paranoia there are no hallucinations, and the patient's delusions are pure preconceived ideas. In other cases hallucinations form the basis of the delusions, the patients hearing, seeing, or feeling things, which they explain to themselves along delusional lines.

Etiology.—These conditions usually begin in middle life, at a time when personal characteristics tend to become fixed. In most cases the family history shows a psychopathic taint. The sexes are about equally affected.

Symptoms.—The onset of the delusions is frequently sudden, and they are rather rapidly thought out and systematized till they fill the patient's whole life and influence his conduct. The patient becomes "queer," often moody and depressed, and the personal bearing changes. Everything that is said or done to the patient is looked at in the light of the delusions. When hallucinations are present, they are explained with reference to the delusions. The most trivial thing done in the presence of the patient he refers to himself, and looks for a hidden meaning in it. A look, a cough, some one passing in front of him, a gesture of the hand—all look suspicious to the patient, and he considers each to have its meaning and to be directed toward himself (ideas of reference). From his false point of view he elaborates all these little occurrences, together with his hallucinations, into a logically thought-out system, in which he believes absolutely and on which he bases his conduct.

In *religious* paranoia the patients believe themselves to be exalted religious personages: Christ, the Virgin, God, saints, the new Messiah, etc.; these ideas may come to them spontaneously or as a result of hallucinations. Then the patients begin to shape their lives to conform with their delusions. They want to preach and extol themselves, and they demand reverence and worship from those about them, and, not receiving it, they become depressed and irritable, and hold themselves aloof from the rest of the world.

Those suffering from *querulent* and *persecutory* paranoia imagine themselves to be victims of a deep-laid plot to kill them, to harm them, or to cheat them out of property they may or may not own. Hallucinations are frequent. They hear voices calling them vile names, telling them they are doomed, etc. They become exceedingly suspicious, and ideas of reference are prominent. They watch everybody they see for suspicious movements, and see something suspicious in everything those they are watching do. They are continually surrounded by detectives who have been engaged to spy on them; by companies or associations which are hostile to them, such as the Freemasons, the Jesuits, or a trust. If a man in the car with them moves his paper or coughs behind his hand, they immediately interpret it as a signal to a confederate. Hallucinations of feeling they think to be due to the action on them of electric, telephonic, or wireless machines directed by their enemies for the purpose of harming them. As the delusions become fixed the patients become depressed, quarrelsome, and secretive, often making trouble for those they live with and changing their residence frequently. At times, when they decide who their arch-enemy is, they will seek police protection, and, not obtaining it, they often take the law into their own hands and attempt to murder him. This they do, not secretly, but openly and boldly, for they feel assured of the justice of their act.

In the *erotic* form, the patients, usually on a hallucinatory basis, believe themselves to be very beautiful and engaged or married to prominent people, such as actors, actresses, noted beauties, statesmen, and royalty. The people in the street speak about them in this light. What they read in the newspapers about their loved one they interpret as veiled hints referring to themselves. Sometimes, in hallucinatory states, they enjoy coitus with the object of their affection. *Alcoholic paranoia* should be considered here. The delusions are usually of infidelity on the part of the husband or wife, and this causes the wildest jealousy on the part of the patient. At times they become violent enough to commit murder. Alcoholic paranoiacs, unlike those with simple paranoia, tend to intellectual deterioration.

In *ambitious* paranoia the patient imagines himself to be some famous person, either living or dead: Napoleon, Cæsar, Shakespeare, great artists, singers, kings, princes, or famous statesmen. The delusions may or may not be based on hallucinations. Ideas of reverence, as in other paranoic conditions, are prominent. These patients form the aristocracy of insane hospitals, never losing sight of their own nobility or fame, considering their incarceration an injustice, due to the ignorance of the authorities, and to which they are never reconciled.

Course.—Chronic. These patients frequently live to a ripe old age. They do not deteriorate intellectually, memory remains perfect, the delusions are unchanged, and the patients are always discontented.

Treatment.—Institutional.

CHAPTER VI.

THE SIMPLE PSYCHOSES—MANIC-DEPRESSIVE INSANITY—INVOLUTION MELANCHOLIA.

MANIC-DEPRESSIVE INSANITY.

We owe to Kraepelin the grouping together of these two diametrically opposed mental states and the conception of them as different forms of the same disease. His work split up the old groups—"mania," which included all excited states, and "melancholia," which included all depressed states.

Etiology.—Insanity in the family, usually of the same form, is found in 80 per cent. of the cases. Women are more often affected than men. Most cases occur before the twenty-fifth year. Psychic shock and head trauma have been mentioned as causative factors. In most cases no immediate cause can be ascertained.

Symptoms.—This disease can best be studied by taking up separately its two phases: the *manic* phase and the *depressed* phase. Manic-depressive insanity has a tendency to recur, and the attacks may be manic or depressed in nature without any regularity. Frequently one phase will pass over into the other. Mixed forms, presenting both manic and depressed features, are well known.

The Manic Phase (*Acute Mania*).—The onset is rather sudden, frequently with a depression, but soon the patient becomes irritable and excitable and the manic features are seen. The patient is restless and continually moving. He shows an overabundance of energy, for he never seems to tire of physical exercise (*psycho-motor unrest*). He cannot remain still, and, even when in bed, must be continually doing something: jumping up and down, throwing his limbs around, etc. He seems to require no rest, for he gets along with remarkably little sleep.

With this motor overactivity there is a corresponding activity in the mental sphere. Ideas flit through the patient's head in rapid fashion, all disconnected, and each one remains but a moment before being replaced by the next. These patients talk incessantly and disconnectedly, but the production is richer in words than in thoughts. In the stream of thought *flight of ideas* is prominent. The patient jumps from one idea to another with great rapidity; one moment speaking of his surroundings, the next mentioning incidents of history, and, in the next breath, talking of his home life. There is no connected strain to his talk, and it is influenced by his surroundings: a word spoken by another patient, the sight of a watch, the jingle of a bunch of keys, etc. (*distractibility*).

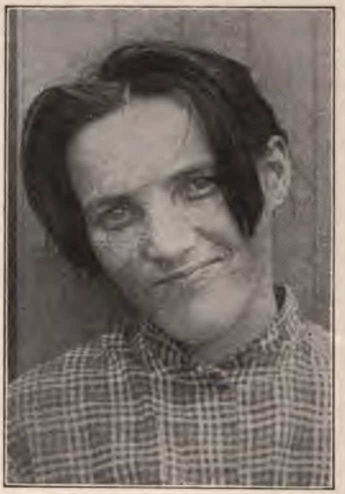

FIG. 49.—Mania (puerperal in origin) (Peterson).

In the stream of talk one word suggests another, and thus changes the trend of thought (*word associations*). Again, the sound of one word suggests another one, as in words which rhyme, and the stream of thought is again diverted (*sound associations*). Senseless rhymes and jingles are produced, and likewise snatches of songs.

The emotional mood is elated and cheerful. The patients laugh, sing, and shout, playfully striking their neighbors; grimace and gesticulate, are pert and witty in their replies, indulging in far-fetched puns. They notice everything, especially personal characteristics, and comment on them. There is usually some uncertainty in orientation, but this is difficult to ascertain, as it is impossible to hold the attention. Memory, if it can be determined, is found unimpaired. Hallucinations are rare and not constant. Illusions are common but fleeting. Occasionally one sees delusions, but they are fantastic and momentary. In the height of the excitement these patients may refuse food, and require forced feeding.

The Depressed Phase (*Acute Melancholia*).—This presents a very different picture from the phase just described. The patient suddenly loses interest in his surroundings, becomes quiet, sad, and morose. He stops his work, feels unable to do anything, and prefers to be left alone, to sit quietly all day and think over his troubles. In direct contrast to the psychomotor unrest of the manic phase we see here *psychomotor retardation*. All movements are slowly started, after a long wait, and slowly performed. Even the slightest movement is an exertion. Energy is absolutely gone. When left alone, the patient sits for hours with bowed head, not caring to move. When aroused and forced to move, he does so slowly, ineffectually, and after a long wait.

The mental state is one of extreme and constant depression. The patient's outlook is one of absolute hopelessness; he sees no future for himself but misery; life holds no more joys for him. Usually the patients have delusions of unworthiness, uncleanliness, or of sin. They have come to their present state all through their own fault—their own baseness; they have committed an unpardonable sin and must suffer in consequence. The whole world is to be destroyed because of them. Nothing can cheer them or change the gloomy trend of their thoughts. As a result of these feelings they very frequently attempt suicide, for death is to them the only solution to their difficulty. Hallucinations are not common. Orientation is usually perfect and memory shows but little defect, but both may be obscured. Very often they refuse all food for long periods of time and require tube-feeding.

Course.—The duration is usually from six to eight months. Very frequently one phase will pass over into the other before recovery takes place. The patient recovers and is able to take up his work, but usually there are remnants of the condition persisting, in defective memory for the period of excitement and more or less defective insight into the condition. Recurrences are the rule, and while most of them are of manic nature, there may be depressive phases at times. Some patients have but one attack, others two or three, while still others have many and finally develop a chronic manic state.

Treatment.—Isolation is necessary and best in an institution. In the stage of excitement the continuous hot bath and hot packs are the best forms of sedative treatment and restraint. If drugs are necessary, bromids, paraldehyd, and hyoscin are useful. Plenty of fresh air and good food are imperative. In the depressed phase, rest in bed in quiet surroundings, plenty of food, using the stomach-tube if necessary, and careful watching are the main points. During convalescence insist upon exercise, a full diet, and some form of occupation.

INVOLUTION MELANCHOLIA.

Under this heading come the depressed conditions which accompany the onset of the senium; perhaps it is a morbid expression of the increasing inefficiency. Probably more than one condition is included here. Some of the cases show a marked similarity to manic-depressive insanity.

Etiology.—Occurs between the ages of 40 and 60 years, usually between 50 and 60. Women are more frequently affected than men. As a general rule, it accompanies the menopause in women, but it may occur later. Heredity is seen in about one-half of the cases. Physical disease, losses, and bereavements are said to play a part.

Symptoms.—The onset is usually slow, with indefinite disorders, emotionalism, depression, and irritability; then follow self-inspection, self-reproach, and delusions of unworthiness and sin develop. The patient is the cause of all the evil in the world; others suffer because of him. He fears punishment, or that he will not get his deserved punishment. At times the delusions are fantastic. The patient believes that he has eaten his own children, or that his brain has been removed and mud substituted. Hallucinations are rare. Orientation is usually preserved and memory is little affected. Refusal of food is not infrequent, and the possibility of suicide is always present.

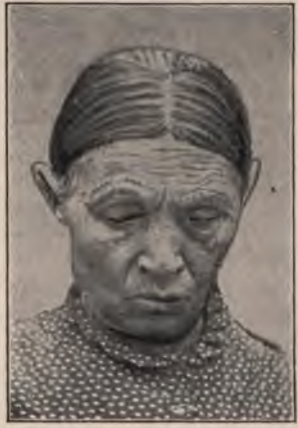

FIG. 50.—Acute melancholia (Peterson).

Prognosis.—Doubtful. About one-fourth of the cases recover after six months to two years. About as many improve so that they are able to return to their families, but usually they remain cranky and surly. Recurrences may occur. About 20 per cent. die within two years.

Treatment.—In mild cases the patient may be treated at home, or, better, removed to the home of relatives or friends. More serious cases should be placed in institutions and treated along the same lines as in the depressed phase of manic-depressive insanity and senile psychosis.

CHAPTER VII.

DEFECTIVE MENTAL DEVELOPMENT.

IMBECILITY AND IDIOCY.

AN arrest of cerebral development, either *in utero* or after birth, and, in consequence, entire absence or enfeeblement of the mental processes.

These two names indicate degrees of mental weakness; it is greatest in the idiot; the extent of mental weakness varies very much.

Etiology.—Heredity plays an important and large part in its causation; consanguineous marriages; syphilis; anything which very materially affects the nutrition and general health of the mother may cause it; injuries, great anxiety, or fright may also be causes. Alcoholism in the ancestors is responsible for a large proportion of these defectives. It may be the result of some cerebral disease coming on in the first period of life or injuries at that age; falls may cause it by the injury done to the brain. (See Spastic Hemiplegia in Children.)

Symptoms.—Numerous classifications have been made of idiots and imbeciles. Ireland described the genetous form which is the result of intra-uterine disturbances; these children are defective when they are born; he thinks the enlarged glands, abscesses, skin eruptions, etc., from which they suffer point to scrofula as a cause. Two-thirds of them he says die of consumption; physically, they are feeble, with impaired circulation, low temperature, cold extremities, and defective sensibilities. Trophic disturbances are easily set up; their secretions are defective and abnormal, with unpleasant odor; the heart is weak, with defective valves and often an open foramen ovale. They have the vaulted palate, the jaw protrudes, and the teeth project. They are dwarfish, and retain an infantile appearance; they are liable to deformities of the fingers and toes, coloboma, and hernia, and the testicles are occasionally wanting.

Cretinoid idiots are not common; they are short, with broad features, wide distance between the eyes, mouth large, thick lips kept open, hands and feet thick and broad (Fig. 51).

In microcephalic idiocy there is lack of development of all the cerebrum or only portions of it, or parts may be entirely absent; the deficiency is generally in a diminution in the size of the hemispheres. The head is narrow and tapering toward the top, the nerves, basal ganglia, and spinal cord are

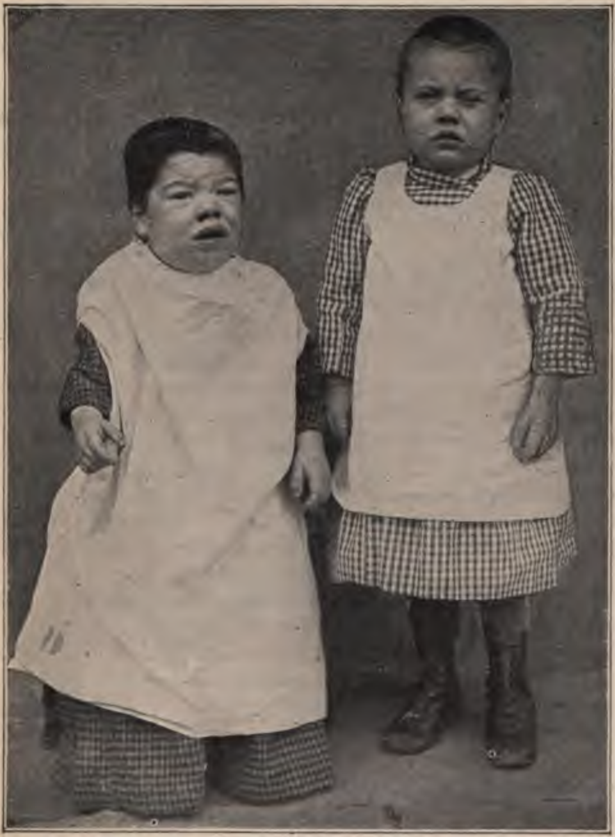

FIG. 51.—Cretin, aged thirteen years, standing beside normal brother, aged four years (showing dwarfing of growth) (Peterson).

usually better developed than the hemispheres. The cerebellum is relatively larger than in normal brains.

The further divisions are eclampsic, epileptic, hydrocephalic, paralytic, traumatic, inflammatory, etc. It will be unnecessary to go into a detailed explanation of these varieties. In idiots there is scarcely any mental life; they eat and drink when it is given them, regardless of what it is; they neither speak nor have consciousness; they manifest such pleasure and pain as they are capable of by inarticulate sounds or screams, with disorderly movements; they are incapable of education. Some idiots may recognize persons they frequently see; they have no memory or idea of time. Their appearance is usually hideous; they eat ravenously what is set before them; they often drink the most disgusting and disagreeable tasting fluids; they do not appear to suffer pain as do normal individuals; they do not notice bruises and cuts, and often show no evidence of extreme changes of temperature.

Imbecility is a less profound arrest of the mental processes; it usually occurs as the result of some disease process—if not at birth, in the first three or four years of life, but it may also occur before birth as some defect in development. Imbeciles vary very much as to their behavior, facial expression, movements, etc., and their ability to learn. They are susceptible of more or less education. Those who suffer epilepsy as a complication are less favorable in this respect. The degree of mental activity varies; many make great efforts to learn to walk and what is taught them. They often have great difficulty in learning numbers. If they are slow in learning to walk, they will be slow in learning to speak and in the acquiring of other knowledge. The ability to speak depends upon the range of ideas which the child is capable of. Some idiots never speak; they appear to be aphasic; they often show an aptitude for music.

These imbeciles and idiots may have, besides the epilepsy alluded to, paralysis, hemiplegic or paraplegic in type (see Spastic Hemiplegia in Children), as the result of atrophies of the brain. Disseminated sclerosis may be found, and various abnormalities of the cerebral conformation.

For further information on this subject consult Ireland, Idiocy and Imbecility; E. Seguin, Idiocy; the reports of *Dr. Kerlin,* Dr. Wilbur, etc.

Bibliography.—The following periodicals are devoted exclusively to the study of nervous and mental diseases:

British: Brain; Mind; Proceedings of the Society for Psychical Research; Journal of Mental Science; Review of Neurology and Psychiatry.

American: Alienist and Neurologist; Journal of Insanity; Journal of Comparative Neurology; Journal of Nervous and Mental Disease; Journal of Psychology; Psychological Review; Quarterly Journal of Inebriety; Journal of Abnormal Psychology.

French: Archives Anthropologie Criminelle; Annales Médico-Psychologiques; Annales des Sciences Psychiques; Archives de Neurologie; Nouvelle Iconographie de la Salpêtrière; Revue Philosophique; Revue de Psychiatrie; Revue de l'Hypnotisme; Bulletin de l'Institut Psychique; Revue Neurologique.

Belgian.—Bulletin de la Société de Médecine Mentale de Belgique; Le Nevraxe.

German: Allgemeine Zeitschrift für Psychiatrie; Archiv für Psychatrie und Nervenkrankheiten; Zeitschrift für die gesammte Neurologie und Psychiatrie; Der Irrenfreund; Jahrbücher für Psychiatrie; Kraepelin's Psychologische Arbeiten; Monatsschrift für Psychiatrie und Neurologie; Neurologisches Centralblatt; Philosophische Studien; Neurologische Psychiatrische Wochenschrift; Zeitschrift für Psychologie; Deutsche Zeitschrift für Nervenheilkunde.

Italian: Annali di Freniatria; Annali di Nevrologia; Archivio di Psichiatria; Il Manicomio Moderno; La Psichiatria; Rivista di Patologia nervosa e mentale; Rivista Sperimentale di Freniatria; Rivista Neuropatologia Psichiatria; Rivista di Psicologia.

Russian: Archiv Psychiatrii, Nevrologuii, i Soudebnoi Psychopatologuii; Obozrenie Psychiatrii, Nevrologuii, i Experimentalnoi Psychologuii; Voprosi Nervno-psychitscheckoi Medizini; Voprosi philosophii i psychologuii.

Dutch, Nevrologische en Psychologische Bladen. *Japanese*, Nevrologia. *Norwegian*, Tidskrift, etc.

Practically all these journals are abstracted in the *Journal of Nervous and Mental Disease* of New York, which journal also presents a complete bibliography of American neurology and psychiatry.

There are two other important publications devoted to neurology: one bibliographic entirely. *Jahresbericht über die Leistungen und Fortschritte aus dem Gebiet der Neurologie und Psychiatrie,* by Flatau, Mendel, and Jacobsohn; published by S. Karger, of Berlin.

INDEX.

Abscess of brain, 106
Acromegaly, 118
Acroparesthesia, 17
Agnosia, 96
Agrophobia, 153
Alcoholic dementia, 160
  hallucinosis, acute, 157
  neuritis, 25
  paranoia, 170
  psychoses, 157
  states, chronic, 158
Amyotrophic lateral sclerosis, 64
Analgesias, 17
Anesthesias, 17
Anterior horns of cord, chronic myelitis of, 46
    lesion of, 64
Anterolateral columns of cord, diseases of, 58
Aphasia, 94
  motor, 95
  sensory, 95
    subcortical, 96
  total, 95
  transcortical, 96
Apoplexy, 97
Apraxia, 96
Ascending paralysis, acute, 44
Astereognosis in brain disease, 88
Ataxia, hereditary, 61
Ataxic paraplegia, 60
Athetosis, 101
Atrophy, Erb's juvenile, 111
  facial, unilateral, 144
  facioscapulohumeral, 112
  hereditary progressive muscular, 112
  Landouzy-Déjérine, 112
  of Herbert Tooth, 49
  progressive muscular, 46
  spastic muscular, 64

Basal ganglia, lesions of, 91
Basedow's disease, 113
Bell's palsy, 29
Blindness, psychic, 96
Brachial plexus, 35
    injury of, paralysis from, 34
Brain, abscess of, 106
  base of, lesions of, 93
  diseases, 85, 97
    astereognosis in, 88
    convulsions in, 85
    deafness in, 90
    emotions in, 90
    hearing in, 90
    Jacksonian epilepsy in, 86
    localization of, 85
    paralysis in, 85, 86
    sight in, 88
    smell sense in, 90
    spasm in, 85
    taste sense in, 90
    touch sense in, 88

Brain diseases, vision in, 88
  tumors, 103
Broca and Wernicke's theory of speech localization, 95

CATATONIC form of dementia præcox, 161
Cauda equina, lesions of, 75
Causalgia, 22
Central gray matter of cord, lesions of, 66
Cephalalgia, 137
Cerebellum, lesion of, 94
  middle peduncles of, lesions of, 94
Cerebral cortex, localization in, 86
  endarteritis, 99
  hemorrhage, 97
  meninges, diseases of, 81
  sinuses, thrombosis of, 99
  vessels, 85
    occlusion of, 99
    thrombosis of, 99
Cerebrospinal syphilis, 83
Cervical plexus of nerves, 31
Cervicobrachial neuralgia, 18
Cervico-occipital neuralgia, 18
Charcot's disease, 64
Chorea, 130
  hereditary, 131
Circumflex nerve, paralysis of, 34
Clubbed foot of Friedreich's disease, 62
Coccygodynia, 18
Colic, lead, 27
Combined sclerosis, 60
Constitutional psychopathy, 152
  psychoses, 147
Convulsions in brain diseases, 85
Corpora quadrigemina, lesions of, 91
  striata, lesion of, 91
Cortical spasms in brain diseases, 86
Cretinism, 116
  sporadic, 114
Cretinoid idiots, 176

DEAFNESS in brain diseases, 90
  psychic, 96
  word, 96
Defective mental development, 176
Degenerative psychoses, 160
Delirium tremens, 157
Delusions, 146
Dementia, alcoholic, 160
  epileptic, 160
  meningitica, 160
  paralytica, 162
  præcox, 160
  senile, 160, 167
Depressor fibers, 141
Digital neuralgia, 18
Diphtheric neuritis, 26
Dipsomaniacs, 158
Disorders of undetermined pathogeny, 121
Duchenne-Erb paralysis, 34
Ductless glands, diseases of, 113
Dystrophy, muscular, 109
    pseudohypertrophic, 109

ECHOLALIA, 96
Embolic closure of cerebral vessels, 99
Emotions in brain diseases, 90
Endarteritis, cerebral, 99
Epilepsies, 134

Epilepsies, Jacksonian, 86, 134
  precursive, 135
  spinal, 73
Epileptic dementia, 160
  psychosis, 154
Erb's juvenile atrophy, 111
Erythemomegalalgia, 142
Exophthalmic goiter, 113
External rectus, paralysis of, 29

FACIAL atrophy, unilateral, 144
  paralysis, peripheral, 29
  spasm, 129
    unilateral, 128
Facioscapulohumeral atrophy, 112
Fears, morbid, 153
Friedreich's disease, 61

GASTRIC crises in tabes dorsalis, 52
Gigantism, 118
Goiter, exophthalmic, 113
Grand mal, 135
Graves' disease, 113

HABIT-SPASMS, 126
Hallucinations, 146
Hallucinosis, alcoholic, 157
Headache, 137
  sick, 139
Hearing in brain diseases, 90
Hebephrenic form of dementia præcox, 161
Hemicrania, 139
Hemiplegia, spastic, in children, 100
Hemorrhage, cerebral, 97
Hereditary ataxia, 61
  chorea, 131
Herpes zoster, 20
Homosexuality, 153
Hydrocephalus, chronic, 107
  internal, 107
Hydromyelia, 66
Hypophysis, lesions of, 93
Hysteria, 147
  convulsive seizures in, 150
  treatment, 151
Hysteric psychosis, 156
Hystero-epileptic attacks, 150

IDIOCY, 176
Illusions, 146
Imbecility, 176
Infantile spinal paralysis, 40
Infective-exhaustive psychoses, 159
Injuries of nerves, 21
Insane, paralysis of, general, 162
Insanity, 145
  manic-depressive, 171
Intercostal neuralgia, 18
Intestinal crises in tabes dorsalis, 52
Intoxication psychoses, 157
Involution melancholia, 174

JACKSONIAN epilepsy, 134

KORSAKOW'S psychosis, 158

LANDOUZY-DÉJÉRINE atrophy, 112
Landry's paralysis, 44
Laryngeal branches of vagus, paralysis of, 38
  crises in tabes dorsalis, 53
Lateral sclerosis, 58
    amyotrophic, 64

Lateral tracts of cord, lesion of, 64
Lead colic, 27
  neuritis, 27
Leptomeningitis, 81
  with pus, 81
Little's disease, 60
Locomotor ataxia, 50. See also *Tabes dorsalis.*
Lumbago, 18
Lumbar plexus, paralysis of, 38
Lumbo-abdominal neuralgia, 18

MAIN en griffe, 49
Mammary neuralgia, 18
Mania, acute, 171
Manic-depressive insanity, 171
Marie's theory of speech localization, 95
Masochism, 153
Median nerve, paralysis of, 33
Medulla, diseases of, 39, 91
Melancholia, acute, 173
  involution, 174
Meninges, diseases of, 81
Meningitis, 81
  gummatous, 83
  of convexity, 81
  purulenta, 81
  spinal acute, 81
  syphilitic, chronic, 83
  tuberculous, 82
Meningomyelitis, syphilitic, 83
Mental accidents, 148
  development, defective, 176
  stigmata, 148
Migraine, 139
Mimic tic, 129
Mind, diseases of, 145
Morton's tarsalgia, 18
Morvan's disease, 69
Motor aphasia, 95
  nerves, peripheral, paralysis of muscles supplied by, 28
  neurons, peripheral, diseases of, 21
  neuroses, 125
  nuclei, involvement of, 40
Motor-sensory neurons, diseases of, 21
Multiple neuritis, 24
  scleroses, 78
Muscles, diseases of, 109
Muscular dystrophy, 109
  spasms, 126
Musculospiral nerves, paralysis of, 33
  palsy, 24
Myelitis, 70
  chronic, of anterior horns of cord, 46
  compression, 72
  peri-ependymal, 66
  treatment, 72
Myxedema in adult, 117
  in child, 116

NERVES, injuries of, 21
Neuralgia, 17
  cervicobrachial, 18
  cervico-occipital, 18
  intercostal, 18
  lumbo-abdominal, 18
  mammary, 18
  paræsthetica, 18
  plantar, 18
  supra-orbital, 19
  trifacial, 19
Neurasthenia, 121
Neuritis, 23

Neuritis, alcoholic, 25
  diphtheric, 26
  lead, 27
  multiple, 24
Neuropsychoses, general, 154
Neuroses, motor, 125
  occupation, 125
  traumatic, 125
  vasomotor, 137
Nodding spasm, 129

OBSTETRIC paralysis, 34
Occlusion of cerebral vessels, 99
Occupation neuroses, 125
Oculomotor nerve, paralysis of, 28
Ophthalmoplegia externa, 105

PALSY. See *Paralysis*.
Paralexia, 95
Paralysis agitans, 132
  alcoholic, 25
  ascending acute, 44
  Bell's, 29
  diphtheric, 26
  Duchenne-Erb, 34
  facial, peripheral, 29
  from injury of brachial plexus, 34
  in brain diseases, 85, 86
  infantile spinal, 40
  Landry's, 44
  musculospiral, 24, 33
  obstetric, 34
  of circumflex nerve, 34
  of external rectus, 29
  of insane, general, 162
  of laryngeal branches of vagus, 38
  of lumbar plexus, 38
Paralysis of median nerve, 33
  of muscles supplied by peripheral motor nerves, 28
  of oculomotor nerve, 28
  of sacral plexus, 38
  of ulnar nerve, 33
  progressive, 162
  pseudohypertrophic, 109
  spinal, in adult, 43
    infantile, 40
    spastic, 58
  subcortical, 86
  vasomotor, 140
Paranoia, 168
  alcoholic, 170
  ambitious, 170
  erotic, 170
  persecutory, 169
  querulent, 169
  religious, 169
Paranoic forms of dementia præcox, 161
Paraplegia, ataxic, 60
  spastic, 58
    in children, 101
Paresis, progressive, 162
Paresthesia, 17
Parkinson's disease, 133
Peripheral facial paralysis, 29
  motor nerves, paralysis of muscles supplied by, 28
    neurons, diseases of, 21
  nervous system, diseases of, 17
  sensory neurons, 17
Peroneal atrophy of Tooth, 49
Perversions, sexual, 153
Petit mal, 135
Pituitary body, lesions of, 93
Plantar neuralgia, 18
Plexus, brachial, 35

Plexus, brachial, injury of, paralysis from, 34
  lumbar, paralysis of, 38
  of nerves, cervical, 31
  sacral, 37
    paralysis of, 38
Poliomyelitis, acute anterior, 40
  anterior, 40
Pons, lesion of, 91
Posterior columns of cord, disease of, 50
Posterolateral column of cord, lesion of, 60
Presser nerve-fibers, 141
Primary sclerosis of lateral columns, 58
Progressive muscular atrophy, 46
  paresis, 162
Psychiatry, 145
Psycho-motor retardation, 173
  unrest, 172
Psychoneuroses, 121
Psychopathy, constitutional, 152
Psychoses, 145
  alcoholic, 157
  constitutional, 147
  degenerative, 160
  epileptic, 154
  hysteric, 156
  infective-exhaustive, 159
  intoxication, 157
  Korsakow's, 158
  senile, 160, 167
  simple, 171

RAYNAUD'S disease, 143
Romberg symptom in tabes dorsalis, 51

SACRAL plexus, 37
    paralysis of, 38
Sadism, 153
Scleroses, combined, 60
  diffuse peri-ependymal, 66
  disseminated, 78
  lateral, 58
    amyotrophic, 64
  multiple diffuse, 78
  primary, of lateral columns, 58
Senile dementia, 160, 167
Sensory aphasia, 95
    subcortical, 96
  neurons, peripheral, 17
Sick headache, 139
Sight in brain diseases, 88
Smell sense in brain diseases, 90
Spasm, facial, 129
    unilateral, 128
  habit, 126
  in brain diseases, 85
  muscular, 126
  nodding, 129
  spinal accessory, 127
  vasomotor, 140
Spastic hemiplegia in children, 100
  paraplegia in children, 101
Speech localization, 95
Spinal accessory spasm, 127
  cord, anterior horns of, chronic myelitis of, 46
      lesion of, 64
    anterolateral columns of, diseases of, 58
    central gray matter of, lesions of, 66 [illegible]
  ce

- Spinal cord, diseases of, 39
    - functions of segments of, 77
    - lateral tracts of, lesion of, 64
    - localization of, lesions of, 74
    - midlumbar, lesions of, 75
    - posterior columns of, disease of, 50
    - posterolateral column of, lesion of, 60
    - tumors of, 74
    - upper, lesions of, 75
  - epilepsy, 73
  - meninges, diseases of, 81
  - meningitis, acute, 81
  - paralysis in adult, 43
    - infantile, 40
- Status epilepticus, 136
- Supra-orbital neuralgia, 19
- Syphilis, cerebrospinal, 83
- Syringomyelia, 66
    - diagnosis, 69
  - pathologic anatomy, 69
  - symptoms, 66

- TABES dorsalis, 50
    - apoplexy in, 53
    - ataxia in, 51
    - crises in, 52, 53
    - diagnosis, 56
    - pathology, 54
    - Romberg symptom in, 51
    - spasmodique, 58
    - treatment, 56
- Tactile sense in brain diseases, 88
- Tapir mouth, 112
- Tarsalgia, 18
  - Morton's, 18
- [illegible] brain diseases, 90
- Tegmentum, lesion of, 91
- Telegrapher's cramp, 126
- Tetany, 129
- Thalamic syndrome, 91
- Thomsen's disease, 112
- Thrombosis of cerebral sinuses, 99
    - vessels, 99
- Tic, mimic, 129
  - of Gilles de la Tourette, 129
- Tics, 126
- Tooth's peroneal form of atrophy, 49
- Torticollis, 128
- Touch sense in brain diseases, 88
- Transcortical aphasia, 96
- Trifacial neuralgia, 19
- Tumors, intracranial, 103
  - of spinal cord, 74

- ULNAR nerve, paralysis of, 33
- Unilateral facial atrophy, 144
    - spasm, 128

- VAGUS, laryngeal branches of, paralysis of, 38
- Vasomotor neuroses, 137
  - paralysis, 140
  - spasm, 140
- Vision sense in brain diseases, 88
- Von Graefe sign in exophthalmic goiter, 114

- WORD-DEAFNESS, 96
- Wrist-drop in lead neuritis, 27
- Writer's cramp, 126
- Wry-neck, 128

SAUNDERS' BOOKS

on

GYNECOLOGY

and

OBSTETRICS

W. B. SAUNDERS COMPANY

West Washington Square **Philadelphia**

9, Henrietta Street **Covent Garden, London**

SAUNDERS' ANNOUNCEMENTS

HAVE AN ANNUAL CIRCULATION OF OVER 5,000,000

THE recent growth of our foreign business necessitated some further provision for bringing our new books before the English-speaking profession abroad. In addition to our front cover and inside space in the **British Medical Journal** and the **London Lancet,** we have, therefore, recently arranged for front cover and inside space in the **Indian Medical Gazette,** the **China Medical Journal,** and the **Bulletin of the Manila Medical Society**—each a leading journal in its field.

The extension of our advertising has always gone hand in hand with the expansion of our business both at home and abroad. In 1905 we advertised in 10 journals; in 1906 and in 1907, in 11 journals; in 1908, in 13 journals; in 1909, in 16 journals; in 1910, in 17 journals; in 1911, in 18 journals; and in 1912, in 20 journals, so that the Saunders Announcements now have **an annual circulation of over 5,000,000,** or nearly 100,000 every week in the year.

A Complete Catalogue of our Publications will be Sent upon Request

DeLee's New Obstetrics

Text-Book of Obstetrics. By JOSEPH B. DELEE, M. D., Professor of Obstetrics at Northwestern University Medical School, Chicago. Large octavo of 1060 pages, with 913 illustrations, 150 in colors. Cloth, $8.00 net; Half Morocco, $9.50 net.

JUST READY—SUPERB

You will pronounce this new book the most elaborate, the most superbly illustrated work on Obstetrics you have ever seen. Especially will you value the 913 illustrations, all, with but few exceptions, original, and the best work of leading medical artists. Some 150 of these illustrations are in color. Such a magnificent collection of obstetric pictures—and with *really practical value*—has never before appeared in one book.

You will find the text extremely practical throughout. *Diagnosis* is featured, and the relations of obstetric conditions and accidents to general medicine, surgery, and the specialties are brought into prominence.

Regarding *Treatment:* You get here the very latest advances in this field, and you can rest assured every method of treatment, every step in operative technic, is just right. Dr. DeLee's twenty-one years' experience as a teacher and obstetrician guarantees this.

Worthy of your particular attention are the descriptive legends under the illustrations. These are unusually full, and by studying the pictures serially with their detailed legends you are better able to follow the operations than by referring to the pictures from a distant text—the usual method. These illustrations, with their explanatory legends, you will find particularly valuable for the quick reference work your daily practice demands.

The subject-matter of the book is divided into four parts: The Physiology of Pregnancy, Labor and the Puerperium; the Conduct of Pregnancy, Labor and the Puerperium; the Pathology of Pregnancy, Labor and the Puerperium; and Operative Obstetrics. This arrangement, you see, is extremely practical.

Cullen's
Uterine Adenomyoma

Uterine Adenomyoma. By THOMAS S. CULLEN, M. D., Associate Professor of Gynecology, Johns Hopkins University. Octavo of 275 pages, with original illustrations by Hermann Becker and August Horn. Cloth, $5.00 net.

ILLUSTRATED BY BECKER AND HORN

Dr. Cullen's large clinical experience and his extensive original work along the lines of gynecologic pathology have enabled him to present his subject with originality and precision. The work gives the early literature on adenomyoma, traces the disease through its various stages, and then gives the detailed findings in a large number of cases personally examined by the author. Formerly the physician and surgeon were unable to determine the cause of uterine bleeding, but after following closely the clinical course of the disease, Dr. Cullen has found that the majority of these cases can be diagnosed clinically. The results of these observations he presents in this work.

The Lancet, London

"A good example of how such a monograph should be written. It is an excellent work, worthy of the high reputation of the author and of the school from which it emanates."

Cullen's
Cancer of the Uterus

Cancer of the Uterus. By THOMAS S. CULLEN, M. B., Associate Professor of Gynecology, Johns Hopkins University. Large octavo of 693 pages, with over 300 colored and half-tone text-cuts and eleven lithographs. Cloth, $7.50 net; Half Morocco, $8.50 net.

Howard A. Kelly, M. D.

Professor of Gynecologic Surgery, Johns Hopkins University.

"Dr. Cullen's book is the standard work on the greatest problem which faces the surgical world to-day. Any one who desires to attack this great problem must have this book."

Kelly *and* Cullen's Myomata of the Uterus

Myomata of the Uterus. By HOWARD A. KELLY, M. D., Professor of Gynecologic Surgery at Johns Hopkins University; and THOMAS S. CULLEN, M. B., Associate in Gynecology at Johns Hopkins University. Large octavo of about 700 pages, with 388 original illustrations by August Horn and Hermann Becker. Cloth, $7.50 net; Half Morocco, $9.00 net.

A MASTER WORK

ILLUSTRATED BY AUGUST HORN AND HERMANN BECKER

This monumental work, the fruit of over ten years of untiring labors, will remain for many years the last word upon the subject. Written by those men who have brought, step by step, the operative treatment of uterine myoma to such perfection that the mortality is now less than one per cent., it stands out as the record of greatest achievement of recent times.

The illustrations have been made with wonderful accuracy in detail by Mr. August Horn and Mr. Hermann Becker, whose superb work is so well known that comment is unnecessary. For painstaking accuracy, for attention to every detail, and as an example of the practical results accruing from the association of the operating amphitheater with the pathologic laboratory, this work will stand as an enduring testimonial.

Surgery, Gynecology, and Obstetrics

"It must be considered as the most comprehensive work of the kind yet published. It will always be a mine of wealth to future students."

New York Medical Journal

"Within the covers of this monograph every form, size, variety, and complication of uterine fibroids is discussed. It is a splendid example of the rapid progress of American professional thought."

Bulletin Medical and Chirurgical Faculty of Maryland

"Few medical works in recent years have come to our notice so complete in detail, so well illustrated, so practical, and so far reaching in their teaching to general practitioner, specialist, and student alike."

Bandler's Medical Gynecology

Medical Gynecology. By S. Wyllis Bandler, M. D., Adjunct Professor of Diseases of Women, New York Post-Graduate Medical School and Hospital. Octavo of 702 pages, with 150 original illustrations. Cloth, $5.00 net; Half Morocco, $6.50 net.

THE NEW (2d) EDITION

This new work by Dr. Bandler is just the book that the physician engaged in general practice has long needed. It is truly *the practitioner's gynecology*—planned for him, written for him, and illustrated for him. There are many gynecologic conditions that do not call for operative treatment; yet, because of lack of that special knowledge required for their diagnosis and treatment, the general practitioner has been unable to treat them intelligently. This work gives just the information the practitioner needs.

American Journal of Obstetrics

"He has shown good judgment in the selection of his data. He has placed most emphasis on diagnostic and therapeutic aspects. He has presented his facts in a manner to be readily grasped by the general practitioner."

Bandler's Vaginal Celiotomy

Vaginal Celiotomy. By S. Wyllis Bandler, M. D. Octavo of 450 pages, with 148 illustrations. Cloth, $5.00 net.

SUPERB ILLUSTRATIONS

The vaginal route, because of its simplicity, ease of execution, absence of shock, more certain results, and the opportunity for conservative measures, constitutes a field which should appeal to all surgeons, gynecologists, and obstetricians. Posterior vaginal celiotomy is of great importance in the removal of small tubal and ovarian tumors and cysts, and is an important step in the performance of vaginal myomectomy, hysterectomy, and hysteromyomectomy. Anterior vaginal celiotomy with thorough separation of the bladder is the only certain method of correcting cystocele.

The Lancet, London

"Dr. Bandler has done good service in writing this book, which gives a very clear description of all the operations which may be undertaken through the vagina. He makes *out a strong* case for these operations."

Ashton's Practice of Gynecology

The Practice of Gynecology. By W. EASTERLY ASHTON, M.D., LL.D., Professor of Gynecology in the Medico-Chirurgical College, Philadelphia. Handsome octavo volume of 1100 pages, containing 1058 original line drawings. Cloth, $6.50 net; Half Morocco, $8.00 net.

JUST READY—THE NEW (5th) EDITION

Among the important new matter may be mentioned the De Keating-Hart fulguration treatment, Coley's mixed toxins for sarcoma of the genito-urinary organs, the cutireaction of von Pirquet in the diagnosis of tuberculosis, "606" for syphilis, the hormone theory, the Fowler-Murphy treatment of suppurative peritonitis, tincture of iodin in sterilization, and Baldy's new round ligament operation for retrodisplacement. Nothing is left to be taken for granted, the author not only telling his readers in every instance what should be done, but also precisely *how to do it*. A distinctly original feature of the book is the illustrations, numbering 1058 line drawings made especially under the author's personal supervision.

From its first appearance Dr. Ashton's book set a standard in *practical* medical books; that he *has* produced a work of unusual value to the medical practitioner is shown by the demand for new editions.

Howard A. Kelly, M. D.,

Professor of Gynecologic Surgery, Johns Hopkins University

"It is different from anything that has as yet appeared. The illustrations are particularly clear and satisfactory. One specially good feature is the pains with which you describe so many *details* so often left to the imagination."

Charles B. Penrose, M. D.,

Formerly Professor of Gynecology, University of Pennsylvania.

"I know of no book that goes so thoroughly and satisfactorily into all the *details* of everything connected with the subject. In this respect your book differs from the others."

George M. Edebohls, M.D.

Professor of Diseases of Women, New York Post-Graduate Medical School.

"I have looked it through and must congratulate you upon having produced a textbook most admirably adapted to *teach* gynecology to those who must get their knowledge, *even to the minutest* and most elementary details, from books."

Webster's Diseases *of* Women

Diseases of Women. By J. CLARENCE WEBSTER, M. D. (EDIN.), F. R. C. P. E., Professor of Gynecology and Obstetrics in Rush Medical College. Octavo of 712 pages, with 372 illustrations. Cloth, $7.00 net; Half Morocco, $8.50 net.

FOR THE PRACTITIONER

Dr. Webster has written this work *especially for the general practitioner*, discussing the clinical features of the subject in their widest relations to general practice rather than from the standpoint of specialism. The magnificent illustrations, three hundred and seventy-two in number, are nearly all original. Drawn by expert anatomic artists under Dr. Webster's direct supervision, they portray the anatomy of the parts and the steps in the operations with rare clearness and exactness.

Howard A. Kelly, M.D., *Professor of Gynecologic Surgery, Johns Hopkins University.*

"It is undoubtedly one of the best works which has been put on the market within recent years, showing from start to finish Dr. Webster's well-known thoroughness. The illustrations are also of the highest order."

Webster's Obstetrics

A Text-Book of Obstetrics. By J. CLARENCE WEBSTER, M. D. (EDIN.), Professor of Obstetrics and Gynecology in Rush Medical College. Octavo of 767 pages, illustrated. Cloth, $5.00 net; Half Morocco, $6.50 net.

Medical Record, New York

"The author's remarks on asepsis and antisepsis are admirable, the chapter on eclampsia is full of good material, and . . . the book can be cordially recommended as a safe guide."

Hirst's Obstetrics

Just Ready—The New (7th) Edition

A Text-Book of Obstetrics. By BARTON COOKE HIRST, M. D., Professor of Obstetrics in the University of Pennsylvania. Handsome octavo, 1025 pages, with 900 illustrations, 46 in colors. Cloth, $5.00 net; Half Morocco, $6.50 net.

INCLUDING RELATED GYNECOLOGIC OPERATIONS

Immediately on its publication this work took its place as the leading text-book on the subject. Both in this country and abroad it is recognized as the most satisfactorily written and clearly illustrated work on obstetrics in the language. The illustrations form one of the features of the book. They are numerous and the most of them are original. In this edition the book has been thoroughly revised. Recognizing the inseparable relation between obstetrics and certain gynecologic conditions, the author has included all the gynecologic operations for complications and consequences of childbirth, together with a brief account of the diagnosis and treatment of all the pathologic phenomena peculiar to women.

British Medical Journal

"The illustrations in Dr. Hirst's volume are far more numerous and far better executed, and therefore more instructive, than those commonly found in the works of writers on obstetrics in our own country."

Hirst's Diseases of Women

A Text-Book of Diseases of Women. By BARTON COOKE HIRST, M. D. Octavo of 745 pages, 701 illustrations, many in colors. Cloth, $5.00 net; Half Morocco, $6.50 net.

SECOND EDITION

As diagnosis and treatment are of the greatest importance in considering diseases of women, particular attention has been devoted to these divisions. The palliative treatment, as well as the radical operation, is fully described, enabling the general practitioner to treat many of his own patients without referring them to a specialist.

Medical Record, New York

"Its merits can be appreciated only by a careful perusal. . . . Nearly one hundred pages are devoted to technic, this chapter being in some respects superior to the *descriptions in other text-books.*"

Kelly and Noble's Gynecology and Abdominal Surgery

Gynecology and Abdominal Surgery. Edited by HOWARD A. KELLY, M. D., Professor of Gynecology in Johns Hopkins University; and CHARLES P. NOBLE, M.D., formerly Clinical Professor of Gynecology in the Woman's Medical College, Philadelphia. Two imperial octavo volumes of 950 pages each, containing 880 illustrations, mostly original. Per volume: Cloth, $8.00 net; Half Morocco, $9.50 net.

BOTH VOLUMES NOW READY

WITH 880 ORIGINAL ILLUSTRATIONS BY HERMANN BECKER AND MAX BRÖDEL

In view of the intimate association of gynecology with abdominal surgery the editors have combined these two important subjects in one work. For this reason the work will be doubly valuable, for not only the gynecologist and general practitioner will find it an exhaustive treatise, but the surgeon also will find here the latest technic of the various abdominal operations. It possesses a number of valuable features not to be found in any other publication covering the same fields. It contains a chapter upon the bacteriology and one upon the pathology of gynecology, dealing fully with the scientific basis of gynecology. In no other work can this information, prepared by specialists, be found as separate chapters. There is a large chapter devoted entirely to *medical gynecology*, written especially for the physician engaged in general practice. Heretofore the general practitioner was compelled to search through an entire work in order to obtain the information desired. *Abdominal surgery* proper, as distinct from gynecology, is fully treated, embracing operations upon the stomach, upon the intestines, upon the liver and bile-ducts, upon the pancreas and spleen, upon the kidney, ureter, bladder, and the peritoneum. Special attention has been given to *modern technic*. The illustrations are the work of *Mr. Hermann Becker* and *Mr. Max Brödel*.

American Journal of the Medical Sciences

"It is needless to say that the work has been thoroughly done: the names of the authors and editors would guarantee this; but much may be said in praise of the method of presentation, and attention mav be called to the inclusion of matter not to be found elsewhere."

GET THE BEST

American Illustrated Dictionary

THE NEW STANDARD

The New (6th) Edition, Reset

The American Illustrated Medical Dictionary. A new and complete dictionary of the terms used in Medicine, Surgery, Dentistry, Pharmacy, Chemistry, Veterinary Science, Nursing, and all kindred branches; with over 100 new and elaborate tables and many handsome illustrations. By W. A. NEWMAN DORLAND, M.D., Editor of "The American Pocket Medical Dictionary." Large octavo, 986 pages, bound in full flexible leather. Price, $4.50 net; with thumb index, $5.00 net.

A KEY TO MEDICAL LITERATURE

Gives a Maximum Amount of Matter in a Minimum Space

ENTIRELY RESET—A NEW WORK, WITH ADDED FEATURES

We really believe that Dorland's Dictionary is the most useful single book that the medical practitioner can own. We are confident you will get more real use out of it than out of any one book you ever bought.

Nearly every medical paper to-day contains special words which are new to most readers. If *you* want to get the best out of your journals and text-books, Dorland's Dictionary should be on your desk for ready reference.

This new edition defines all the new words, and is a safe key to capitalization, pronunciation, and etymology.

PERSONAL OPINIONS

Howard A. Kelly, M. D.,

Professor of Gynecologic Surgery, Johns Hopkins University, Baltimore.

"Dr. Dorland's dictionary is admirable. It is so well gotten up and of such convenient size. No errors have been found in my use of it."

J. Collins Warren, M.D., LL.D., F.R.C.S. (Hon.)

Professor of Surgery, Harvard Medical School.

"I regard it as a valuable aid to my medical literary work. It is very complete and of convenient size to handle comfortably. I use it in preference to any other."

Penrose's Diseases of Women

Sixth Revised Edition

A Text-Book of Diseases of Women. By CHARLES B. PENROSE, M. D., PH. D., formerly Professor of Gynecology in the University of Pennsylvania; Surgeon to the Gynecean Hospital, Philadelphia. Octavo volume of 550 pages, with 225 fine original illustrations. Cloth $3.75 net.

UP TO DATE—ACCURATE

Regularly every year a new edition of this excellent text-book is called for, and it appears to be in as great favor with physicians as with students. Indeed, this book has taken its place as the ideal work for the general practitioner. The author presents the best teaching of modern gynecology, untrammeled by antiquated ideas and methods. In every case the most modern and progressive technique is adopted, and the main points are made clear by excellent illustrations.

Howard A. Kelly, M.D.,

Professor of Gynecologic Surgery, Johns Hopkins University, Baltimore.

"I shall value very highly the copy of Penrose's 'Diseases of Women' received. I have already recommended it to my class as THE BEST book."

Davis' Operative Obstetrics

Operative Obstetrics. By EDWARD P. DAVIS, M.D., Professor of Obstetrics at Jefferson Medical College, Philadelphia. Octavo of 483 pages, with 264 illustrations. Cloth, $5.50 net.

INCLUDING SURGERY OF NEWBORN

Dr. Davis' new work on Operative Obstetrics is a most practical one and no expense has been spared to make it the handsomest work on the subject, as well. Every step in every operation is described minutely, and the technic shown by beautiful new illustrations. Dr. Davis' name is sufficient guarantee for something above the ordinary.

Dorland's Modern Obstetrics

Modern Obstetrics: General and Operative. By W. A. Newman Dorland, A. M., M. D., Professor of Obstetrics at Loyola University, Chicago. Handsome octavo volume of 797 pages, with 201 illustrations. Cloth, $4.00 net.

Second Edition, Revised and Greatly Enlarged

In this edition the book has been entirely rewritten and very greatly enlarged. Among the new subjects introduced are the surgical treatment of puerperal sepsis, infant mortality, placental transmission of diseases, serum-therapy of puerperal sepsis, etc.

Journal of the American Medical Association

"This work deserves commendation, and that it has received what it deserves at the hands of the profession is attested by the fact that a second edition is called for within such a short time. Especially deserving of praise is the chapter on puerperal sepsis."

Davis' Obstetric and Gynecologic Nursing

Obstetric and Gynecologic Nursing. By Edward P. Davis, A. M., M. D., Professor of Obstetrics in the Jefferson Medical College and Philadelphia Polyclinic; Obstetrician and Gynecologist, Philadelphia Hospital. 12mo of 436 pages, illustrated. Buckram, $1.75 net.

THIRD REVISED EDITION

This volume gives a very clear and accurate idea of the manner to meet the conditions arising during obstetric and gynecologic nursing. The third edition has been thoroughly revised.

The Lancet, London

"Not only nurses, but even newly qualified medical men, would learn a great deal by a perusal of this book. It is written in a clear and pleasant style, and is a work we can recommend."

Garrigues' Diseases of Women **Third Edition**

A TEXT-BOOK OF DISEASES OF WOMEN. By HENRY J. GARRIGUES, A. M., M. D., Gynecologist to St. Mark's Hospital and to the German Dispensary, New York City. Handsome octavo, 756 pages, with 367 engravings and colored plates. Cloth, $4.50 net; Half Morocco, $6.00 net.

Thad. A. Reamy, M. D., *Professor of Gynecology, Medical College of Ohio.*

"One of the best text-books for students and practitioners which has been published in the English language; it is condensed, clear, and comprehensive. The profound learning and great clinical experience of the distinguished author find expression in this book."

Macfarlane's Gynecology for Nurses

A REFERENCE HAND-BOOK OF GYNECOLOGY FOR NURSES. By CATHARINE MACFARLANE, M. D., Gynecologist to the Woman's Hospital of Philadelphia. 32mo of 150 pages, with 70 illustrations. Flexible leather, $1.25 net.

A. M. Seabrook, M. D., *Woman's Medical College of Philadelphia.*

"It is a most admirable little book, covering in a concise but attractive way the subject from the nurse's standpoint."

American Text-Book of Gynecology **Second Edition**

AMERICAN TEXT-BOOK OF GYNECOLOGY. Edited by J. M. BALDY, M. D. Imperial octavo of 718 pages, with 341 text-illustrations and 38 plates. Cloth, $6.00 net.

American Text-Book of Obstetrics **Second Edition**

THE AMERICAN TEXT-BOOK OF OBSTETRICS. In two volumes. Edited by RICHARD C. NORRIS, M. D.; Art Editor, Robert L. Dickinson, M. D. Two octavos of about 600 pages each; nearly 900 illustrations, including 49 colored and half-tone plates. Per volume: Cloth, $3.50 net.

Matthew D. Mann, M. D.,

Professor of Obstetrics and Gynecology, University of Buffalo.

"I like it exceedingly and have recommended the first volume as a text-book. It is certainly a most excellent work. I know of none better."

Schäffer and Webster's Operative Gynecology

Atlas and Epitome of Operative Gynecology. By DR. O. SCHÄFFER, of Heidelberg. Edited, with additions, by J. CLARENCE WEBSTER, M. D. (EDIN.), F. R. C. P. E., Professor of Obstetrics and Gynecology in Rush Medical College, in affiliation with the University of Chicago. 42 colored lithographic plates, many text-cuts, a number in colors, and 138 pages of text. *In Saunders' Hand-Atlas Series.* Cloth, $3.00 net.

Much patient endeavor has been expended by the author, the artist, and the lithographer in the preparation of the plates for this Atlas. They are based on hundreds of photographs taken from nature, and illustrate most faithfully the various surgical situations. Dr. Schäffer has made a specialty of demonstrating by illustrations.

Medical Record, New York

"The volume should prove most helpful to students and others in grasping details usually to be acquired only in the amphitheater itself."

DeLee's Obstetrics for Nurses

Obstetrics for Nurses. By JOSEPH B. DE LEE, M. D., Professor of Obstetrics in the Northwestern University Medical School, Chicago; Lecturer in the Nurses' Training Schools of Mercy, Wesley, Provident, Cook County, and Chicago Lying-In Hospitals. 12mo of 512 pages, fully illustrated.

Cloth, $2.50 net.

THE NEW (3d) EDITION

While Dr. DeLee has written his work especially for nurses, the practitioner will also find it useful and instructive, since the duties of a nurse often devolve upon him in the early years of his practice. The illustrations are nearly all original and represent photographs taken from actual scenes. The text is the result of the author's many years' experience in lecturing to the nurses of five different training schools.

J. Clifton Edgar, M. D.,

Professor of Obstetrics and Clinical Midwifery, Cornell University, New York.

"*It is far and away the best that has come to my notice, and I shall take great pleasure in recommending* it to my nurses, and students as well."

Schäffer *and* Edgar's

Labor and Operative Obstetrics

Atlas and Epitome of Labor and Operative Obstetrics. By DR. O. SCHÄFFER, of Heidelberg. *From the Fifth Revised and Enlarged German Edition.* Edited, with additions, by J. CLIFTON EDGAR, M. D., Professor of Obstetrics and Clinical Midwifery, Cornell University Medical School, New York. With 14 lithographic plates in colors, 139 other illustrations, and 111 pages of text. Cloth, $2.00 net. *In Saunders' Hand-Atlas Series.*

This book presents the act of parturition and the various obstetric operations in a series of easily understood illustrations, accompanied by a text treating the subject from a practical standpoint.

American Medicine

"The method of presenting obstetric operations is admirable. The drawings, representing original work, have the commendable merit of illustrating instead of confusing."

Schäffer *and* Edgar's

Obstetric Diagnosis and Treatment

Atlas and Epitome of Obstetric Diagnosis and Treatment. By DR. O. SCHÄFFER, of Heidelberg. *From the Second Revised German Edition.* Edited, with additions, by J. CLIFTON EDGAR, M. D., Professor of Obstetrics and Clinical Midwifery, Cornell University Medical School, N. Y. With 122 colored figures on 56 plates, 38 text-cuts, and 315 pages of text. Cloth, $3.00 net. *In Saunders' Hand-Atlas Series.*

This book treats particularly of obstetric operations, and, besides the wealth of beautiful lithographic illustrations, contains an extensive text of great value. This text deals with the practical, clinical side of the subject.

New York Medical Journal

"The illustrations are admirably executed, as they are in all of these atlases, and the text can safely be commended, not only as elucidatory of the plates, but as expounding the scientific midwifery of to-day."

American Pocket Dictionary

New (7th) Edition

The American Pocket Medical Dictionary. Edited by W. A. Newman Dorland, A. M., M. D. With 610 pages. Full leather, limp, with gold edges, $1.00 net; with patent thumb index, $1.25 net.

James W. Holland, M. D.,
Professor of Chemistry and Toxicology, at the Jefferson Medical College, Philadelphia.

"I am struck at once with admiration at the compact size and attractive exterior I can recommend it to our students without reserve."

Cragin's Gynecology

New (7th) Ed.

Essentials of Gynecology. By Edwin B. Cragin, M. D., Professor of Obstetrics, College of Physicians and Surgeons, New York. Crown octavo, 240 pages, 62 illustrations. Cloth, $1.00 net. *In Saunders' Question-Compend Series.*

Galbraith's Four Epochs of Woman's Life

Second Edition

The Four Epochs of Woman's Life: A Study in Hygiene. Maidenhood, Marriage, Maternity, Menopause. By Anna M. Galbraith, M. D. With an Introductory Note by John H. Musser, M. D., University of Pennsylvania. 12mo of 247 pages. Cloth, $1.50 net.

Schaffer and Norris' Gynecology

Saunders' Atlases

Atlas and Epitome of Gynecology. By Dr. O. Schaffer, of Heidelberg. Edited, with additions, by Richard C. Norris, A. M., M. D., Assistant Professor of Obstetrics, University of Pennsylvania. 207 colored illustrations on 90 plates, 65 text-cuts, and 272 pages of text. Cloth, $3.50 net.

Ashton's Obstetrics

New (7th) Ed.

Essentials of Obstetrics. By W. Easterly Ashton, M. D., Professor of Gynecology in the Medico-Chirurgical College, Philadelphia. Crown octavo, 252 pages, 109 illustrations. Cloth, $1.00 net. *In Saunders' Question-Compend Series.*

Southern Practitioner

"An excellent little volume, containing correct and practical knowledge. An admirable compend, and the best condensation we have seen."

Barton and Wells' Medical Thesaurus

A Thesaurus of Medical Words and Phrases. By Wilfred M. Barton, M. D., Assistant to Professor of Materia Medica and Therapeutics, Georgetown University, Washington, D. C.; and Walter A. Wells, M. D., Demonstrator of Laryngology, Georgetown University, Washington, D. C. 12mo of 534 pages. Flexible leather, $2.50 net; with thumb index, $3.00 net.

LANE MEDICAL LIBRARY

To avoid fine, this book should be returned on
or before the date last stamped below.

SA on-
a best
illust ow
recog ire
with ted
States in-
valua 00
copie sed
and e eir
fifth a

1. E RY

2. E By

3. E By

4. E w-
ER,

5. ES N.
D.

6. ESSENTIALS OF PATHOLOGY AND MORBID ANATOMY. By H. HARLOW BROOKS, M.D. *A new work. Preparing.*

7. ESSENTIALS OF MATERIA MEDICA, THERAPEUTICS, AND PRESCRIPTION-WRITING. 7th ed. By HENRY MORRIS, M.D. Revised by W. A. BASTEDO, PH.G., M.D.

8, 9. ESSENTIALS OF PRACTICE OF MEDICINE. By W. R. WILLIAMS, M.D. (Double number, $1.75 net.)

(Continued on Opposite Page)

Saunders' Comp

10. ESSENTIALS OF GYNECOLOGY. 7th ed. W
By Edwin B. Cragin, M.D. Revised by Fr
M.D.

11. ESSENT
8o i

12. ESSENT
VE
Edw

13. ESSENT
EA
illu

14. ESSEN
tra

15. ESSEN
W

17. ESSEN
M.

19. ESSEN
By

20. ESSEN
an
V

21. ESSEN
4
by

24 ESSEN
tr

L356 Shaw, J.C. 90633
S53 Essentials of nervous diseases and
1913 insanity.

NAME	DATE DUE